STATE OF ARKANSAS
ARKANSAS PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION FOR APPROVAL OF THE ARKANSAS WEATHERIZATION PROGRAM SUBMITTED BY ENTERGY ARKANSAS, INC., SOUTHWESTERN ELECTRIC POWER COMPANY, OKLAHOMA GAS AND ELECTRIC COMPANY, THE EMPIRE DISTRICT ELECTRIC COMPANY, CENTERPOINT ENERGY ARKANSAS GAS, SOURCE GAS COMPANY AND ARKANSAS OKLAHOMA GAS CORPORATION	)	DOCKET NO. 07-079-TF
IN THE MATTER OF THE ARKANSAS WEATHERIZATION PROGRAM	)	DOCKET NO. 08-065-RP

ARKANSAS WEATHERIZATION PROGRAM

Annual Report – 2014
filed by

ARKANSAS COMMUNITY ACTION AGENCIES ASSOCIATION, INC.
March 31, 2015

ARKANSAS WEATHERIZATION PROGRAM
Annual Report - 2014

PART 1. NARRATIVE REPORT

1.0 EXECUTIVE SUMMARY

Historical Background

To bring sustainable energy practices to the state and reduce electricity, natural gas, and/or other fuel consumption, the Commission opened Docket 06-004-R, directing the utilities to propose "Quick-Start" energy efficiency programs to begin saving energy in the state as quickly as possible, with a further mandate to file a slate of more comprehensive energy efficiency programs later. Through a productive collaborative process, the electric and gas utilities, along with the Arkansas Community Action Agencies Association, Inc. (ACAAA), proposed the Arkansas Weatherization Program (AWP). The AWP targets severely energy-inefficient homes in Arkansas, is open to all residential customers of participating utilities, and is "piggy-backed" onto the federally-funded U.S. Department of Energy's Weatherization Assistance Program ("DOE WAP") for low-income Americans.

On September 19, 2007, the PSC approved the AWP in Order No. 4, at 11, in Docket No. 07-079-TF, as a Quick Start program which began on October 1, 2007. On July 1, 2009, pursuant to the Rules for Conservation and Energy Efficiency Programs ("CEE Rules") and as required by the Commission, the utilities filed a set of Comprehensive Energy Efficiency programs to be implemented in 2010. In its "roadmap order" of February 3, 2010, the Commission approved the AWP, along with several other programs, "for continued and expanded program implementation for 18 months beginning on January 1, 2010, and continuing through June 2011." In a subsequent order on June 30, 2011 (Order No. 20 in 07-079-TF), the Commission approved the AWP for the remainder of 2011 through 2013.

In Docket No. 13-002-U, Order No. 7, at 80-82, the Commission approved an extension of the AWP through 2014, while directing the utilities and program administrators to participate in a "weatherization collaborative" that would develop "uniform whole house program offerings for all residential customers, including those in severely energy inefficient homes, for implementation by January, 2015…" Such a program design was to be submitted to the Commission by April 1, 2014, for implementation beginning January 1, 2015. Upon the request of the Parties Working Collaboratively ("PWC"), the Commission in Order No. 15 at 5-6, approved extension of the filing date for the uniform weatherization program until October 1, 2014, and the utilities' three-year program portfolio filing date until June 1, 2015. The uniform weatherization program was approved in PSC Docket 13-002-U, Order No. 22 at 11, on

December 9, 2014, to be implemented beginning January 2016. This new program will supplant the AWP in the utilities' portfolios of EE programs.[1].

Beginning in program year 2103, the Arkansas Energy Office ("AEO") took over the administration of the WAP (and, therefore, monitoring of the AWP) from the Arkansas Department of Human Services Office of Community Services. On January 9, 2015, ACAAA filed a petition with the Commission asking that ACAAA transfer coordination and oversight duties of the AWP to the Central Arkansas Development Council, Inc. ("CADC"). The Commission on January 26, 2015 issued Order No. 34 allowing ACAAA's withdrawal and transferring coordination and oversight duties including implementation, evaluation, and reporting duties to CADC.

The participating "AWP Utilities" are Arkansas Oklahoma Gas Corporation ("AOG"), SourceGas Arkansas, CenterPoint Energy Arkansas Gas, Empire Electric District Company, Entergy Arkansas, Inc., Oklahoma Gas & Electric Company ("OG&E"),[2] and Southwestern Electric Power Company. Through a Weatherization Services Agreement with the AWP Utilities, the AWP administrator for 2014 was CADC, of Benton, Arkansas. AWP collaborative activities were coordinated by ACAAA. Together with the implementing agencies, this group is known as the "Weatherization Network."

AWP assistance is available to customers of AWP Utilities whose homes are severely energy inefficient. To qualify for the AWP, the customer's home must meet certain specified criteria related to age of the home and energy inefficiency. Through a computerized energy audit of the home and advanced diagnostic technology, appropriate energy-efficiency measures are determined that can provide cost-effective energy savings. The Weatherization Network provider installs the approved measures in the home. Part of the cost of the audit and installation is covered by the customer's AWP Utility, and the balance is the responsibility (co-payment) of the customer. Customers eligible for the DOE WAP have their co-payment covered by that federal program.

Challenges During 2014

The major challenges during program year 2014 for the AWP were as follows:

1. Program adjustments and changes in the Federal Weatherization Assistance Program (WAP) – The AWP piggybacks onto the WAP. The main difference between the two programs is that AWP eligibility is based on a home's energy inefficiency, whereas the WAP is based on client income. With WAP funding levels being reduced in recent years,

[1] In a Motion filed with the Commission on March 6, 2015, the PWC submitted a request to delay the filing of their Three-Year EE Portfolios until June 1, 2016.

[2] OG&E and AOG operate a complementary joint weatherization program for their residential customers who are not eligible for the DOE WAP co-pay.

fewer clients have received services where DOE WAP federal funds would cover the customer co-payment. In addition, state guidance required that Low Income Home Energy Assistance Program (LIHEAP) funds be expended before all other funding streams, resulting in another barrier to AWP production.

2. Areas of the state not fully penetrated during the program year – From the 15 agencies implementing the AWP in 2013, AEO reduced the number of weatherization agencies to just six. Of those six,, only five reported work on AWP homes. This resulted in some parts of the state not being covered by the AWP.

3. Economic environment – A continuing problem for the AWP is that many customers who inquire about the AWP are not eligible for the DOE WAP, which is based on income, so they are unable to access DOE WAP federal funds to cover their customer co-payment. Yet, they do not have enough income to meet the co-payment requirement themselves.

Major Accomplishments

From January 1, 2014, through December 31, 2014, the Weatherization Network conducted 168 AWP home energy audits and installed energy efficiency measures in 158 homes, representing only 13% of production targets.[3] While 11 non-WAP eligible customers were served in the AWP in 2013 (nearly 7% of the total), AWP customers largely continued to be low-income ratepayers, primarily due to the required co-pays.

According to the utilities' independent evaluator ADM Associates, Inc. ("ADM"), who calculated savings estimates from utility contractor Frontier Associates, annual energy savings from homes treated in this period are 330,803 kilowatt-hours (kWh) (including savings from electric co-ops and municipals) and 35,367 gas therms (including savings of propane). Lifetime equivalent savings are 4,629,436 kWh and 518,706 therms. These savings represent electric peak demand savings of 153 kilowatts (KW) and peak gas demand savings of 884 therms.

In 2014, AWP Utilities expended $275,564 on AWP weatherization and energy efficiency projects through CADC.[4] All but 11 customers had co-payments made on customers' behalf by the federally-funded DOE WAP. Total non-utility payments, including WAP and private customer payments, equaled $1,186,807. The AWP Utilities paid a percentage of total costs, with the share depending on whether the customer had only one participating utility (gas or electric), two participating utilities (both gas and electric), or lived in an all-electric house.

[3] All participation and savings results contained in this report were taken from "Evaluation of 2014 Arkansas Weatherization Program" conducted by ADM Associates, March 2015.

[4] In addition, utilities had internal administration, marketing, EM&V and other costs. In addition, some differences between utility payments to CADC and CADC actual expenses for the AWP are due to timing issues and balances, either positive or negative, both at the start of 2014 and at the end of the year. These differences are noted in the Reconciliation Table in the Workbook.

There were no company co-payments from propane dealers, electric co-ops, or municipals, which do not participate in the AWP. However, using data from Frontier Associates, ADM calculated lifetime savings of 58,313 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 860,088 lifetime kWh from electric co-ops and municipals.

Savings have been achieved very cost-effectively. Counting AWP utility costs, including AWP administrative costs, and assuming measure lives from the Arkansas TRM for each measure, savings have been purchased at a lifetime cost to the utilities of only 3.26 cents (3.26¢) per kWh and 24 cents (24¢) per therm.

Progress Achieved vs. Goals and Objectives

The unduplicated number of houses is an important metric in measuring success of the AWP. As noted above, in 2014, a total of 168 AWP homes received energy audits and 158 homes had energy efficiency measures installed.

In 2014, a program goal was to complete a total of 1,920 "projects" (i.e., audits and installation of measures in a "whole-house" approach). In a house with service from two AWP utilities, or with electric heat ("all-electric"), the work at one house is counted as two "projects." In 2014, the actual number of AWP projects completed was 249, or 13% of the target.

Summary of 2014 AWP Utility savings goals:

- 291,045 annual therms (normal weather conditions)
- 6.6 therms per day per home (peak gas demand conditions)
- 2,239,030 annual kWh (normal weather conditions)
- 0.6 average kW per home (peak electric demand conditions)

Summary of 2014 AWP Utility savings results:

- 31,881 annual therms (normal weather conditions)
- 6.36 therms per home (peak gas demand conditions)
- 264,163 annual kWh (normal weather conditions)
- 0.9 kW per home (peak electric demand conditions)

Savings, Participation Levels, Prior Year Comparisons, and Trends

The participation and, therefore, savings decrease in the AWP in 2014 was due to several factors including WAP territory reorganization and a reduction in federal funds coupled with the requirement that all LIHEAP funds allocated to the WAP be expended prior to using other funding sources. Additional factors included a slow economy resulting in a reluctance by private pay customers to spend money for weatherization work and the fact that only five of the six

Weatherization Network agencies performed AWP work in 2014. This resulted in the AWP not being available in some parts of the state.

As changes to the WAP continue during 2015, coordination with the AWP will also evolve. The uniform weatherization program replacing the AWP in 2016 should result in more customers receiving weatherization, while serving all residential rate classes better than the AWP has been able to do.

For 2014, since the goal for the number of homes to be served was the same as that for 2013, savings estimates were kept the same as for 2013. Savings estimates for 2013 were based on results from 2012 which had been evaluated and verified by ADM through an impact evaluation.

Highlights

See "Major Accomplishments" above.

What's Working and What's Not

A true strength of the AWP has been the collaborative effort and coordination among the seven AWP Utilities, the Weatherization Network providers, CADC as the network administrator, ACAAA, (originally) the Department of Human Services Office of Community Services ("DHS/OCS") as an external monitor, and AWP Utilities' contractor Frontier Associates. While coordination among all of these parties has been a challenge, planning, assessing progress, and responding to and overcoming identified obstacles in a collaborative fashion has set the foundation for achievement of substantial energy savings. This was the first full program year where AEO oversaw all external monitoring, and coordination around AWP program implementation suffered. However, the AWP Collaborative process had developed into the Parties Working Collaboratively ("PWC"), which in turn developed the Uniform Weatherization Program approved by the Commission in Docket 13-002-U, Order No. 22, at 11.

Continued strengthening of communications and collaboration by the AWP Utilities and the Weatherization Network was a goal for 2014. ADM, the program evaluator, found that communication among the AWP utilities and other stakeholders had improved substantially in 2014, especially in regard to designing the new uniform weatherization program. Experience gained through the AWP, as well as through the weatherization program implemented by AOG and OG&E, led to a good working relationship among the utilities and all of the stakeholders, to the point where a full consensus was reached on program design. As noted above, the AWP will be replaced with a statewide uniform weatherization program slated to start in 2016. The uniform weatherization program will serve all residential customers, with the utilities paying up to an average of $3000 per home, thereby reducing the amount of co-pay needed and resulting in potentially higher participation rates.

A continuing problem, however, is that many customers who inquire about the AWP are not eligible for the DOE WAP, which is based on income, so they are unable to access DOE WAP federal funds to cover their customer co-payment. Yet, they do not have enough income to meet

the co-payment amount themselves. According to the ADM evaluation report at 15, of the six agencies who implement the WAP, five do not mention the AWP on their web sites. They describe weatherization as an income-based service and do not state that there is no income eligibility level for the AWP with an opportunity to pay for services themselves. Despite this, CADC's continued outreach in 2014 resulted in nearly seven percent (7%) of participating AWP customers providing their own co-pays for weatherization measures. The uniform weatherization program, coupled with financing options, hopefully will encourage even greater participation.

Planned Changes to Program or Budget

The current program is approved through 2015, as noted above. ACAAA staff are assisting CADC with training and technical support on the Annual Report and other oversight tasks as needed. Beyond CADC now overseeing the coordination of the program, no other changes are anticipated for the remainder of 2015.

Training Achievements

During 2014, external training sessions for the Weatherization Network were held in various locations around the state, including at AEO, the annual weatherization training conference in Little Rock, Pine Bluff (agency specific) and Conway among others. A total of 162 trainees attended 54 training sessions.[5] Certificates were awarded in some of the courses, with 82 certificates awarded to trainees. Training sessions averaged over 6.6 hours in length, resulting in 781 person-hours in training.

Some of the classes covered skills and applications specific to weatherization (*e.g.*, auditing, multi-family audits, technical, etc.) or use of weatherization software (*e.g.*, NEAT/MHEA, JAI/ECOS Software), while other classes dealt with related topics of health and safety issues (*e.g.*, lead). Yet other classes covered fiscal matters, management, etc.

In addition to these sessions, internally 70 hours of collaborative meetings (mixture of in person and webinar) took place. Over 45 hours consisted of discussion of developing a uniform weatherization program in Arkansas taking the best elements from the AWP and other similar weatherization programs. Additional discussion topics included unifying C&I programs, updating the TRM, developing an Arkansas potential study, and discussions on EM&V. See the workbook for a detailed listing of sessions and participation levels.

Summary of EM&V Activities Completed

- The Weatherization Network maintains financial and operational data for each AWP home. Relevant data were provided to the AWP Utilities' contractor

[5] The total number of attendees is a duplicated count. In other words, some of the same people may have attended more than one of these sessions.

Frontier Associates for calculating deemed savings and tracking. Utility-specific data were provided to each AWP Utility.

- The utilities contracted with ADM to conduct an impact evaluation of AWP implementation in 2014 and a limited Process Evaluation. See attached Evaluation Report.
- Commission-approved deemed savings included in the Arkansas TRM were used by ADM to estimate energy savings and demand savings for both natural gas and electricity for each AWP utility. Where data were not included in the TRM for some specific measures delivered through the AWP, the DOE WAP National Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software were used to estimate savings.
- Consistent with DOE WAP protocols, the Weatherization Network audited 100% of their own AWP projects and AEO and/or CADC audited at least 10% of all AWP projects.
- ACAAA is reporting AWP EM&V data consistent with rules and procedures established by the Commission.
- In addition to providing data on energy and demand savings, productivity, program costs, and other quantitative data, as part of the annual reporting process, to assess customer satisfaction with the AWP, the Weatherization Network providers surveyed each household that received AWP services during 2014. (See Appendices C and D.) Results were overwhelmingly positive.
- ACAAA participated in several workshops, conference calls, webinars and meetings as part of the EM&V Parties Working Collaboratively throughout 2014.
- ACAAA staff were interviewed by ADM personnel for their evaluation report of the AWP.

Planning and Goal-Setting Process

The AWP is a collaborative effort among the seven AWP Utilities, the six Weatherization Network providers, CADC as the network administrator, ACAAA, the Arkansas Energy Office (AEO) as an external monitor, and the AWP Utilities' contractor Frontier Associates. The AWP Collaborative has remained intact since the inception of the AWP as a "quick-start" program. The work group has met periodically (generally at least quarterly) to set or revise goals, assess progress, address barriers, and propose changes to program design, with conference calls, e-mail exchanges, and other contact added, as needed. Members of the Public Service Commission ("PSC") general staff and the Attorney General's (AG's) office usually have participated in the meetings or conference calls. For 2014, participation goals and budgets remained the same as for 2013.

Process for Estimating Long-Term, Cost-Effective EE Savings

Estimated energy savings and estimated demand savings for AWP-installed measures resulted from use of Commission-approved deemed savings estimates developed by Frontier Associates. These estimates were developed on a measure basis and were aggregated by Frontier for each home weatherized by the Network, based on a determination of their cost-effectiveness during a whole-house audit, and taking into account interactivity of measures. Once energy and demand savings estimates were determined for each utility for program year 2012, an average of these estimates was applied to each home projected to be treated in 2013. For 2014, given the same budgets and projected participation levels as in 2013, projected energy and demand savings projections were held constant. Measure lifetimes for each measure installed were based on measure lifetimes included in the Arkansas TRM as determined by ADM.

Table 1 - Net Verified Savings by Electric Utility

Electric Utility	*# of Homes*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AEP-SWEPCO	12	8.40	31,154.13	461,148.41
EAI	112	105.99	229,868.21	3,271,557.30
OG&E	3	0.63	3,140.96	36,642.36
Non-IOU	41	37.60	66,640.04	860,087.50
Total	168	152.63	330,803.34	4,629,435.56

Table 2 - Net Verified Savings by Gas Utility

Gas Utility	*# of Homes*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*
AOG	3	8.33	479.54	9,590.78
CenterPoint	113	742.24	28,948.28	416,134.08
SGA	11	56.80	2,452.89	34,668.20
Non-IOU	41	76.19	3,485.79	58,313.25
Total	168	883.56	35,366.50	518,706.31

2.0 PROGRAM IMPACTS

The AWP is designed to have a high probability of providing aggregate ratepayer benefits to the majority of utility customers. The AWP:

- Encourages and enables utility customers to make the most efficient use of utility capacity and energy and discourage inefficient and wasteful use of energy;
- Achieves energy efficiency improvements to severely energy-inefficient homes;

- Achieves meaningful energy and demand savings of both electricity and natural gas that potentially contribute to:
    - Reduced energy costs for owners of severely energy-inefficient homes;
    - Improved affordability of energy for all ratepayers through:
        1. Downward pressure on energy prices
        2. Avoided system capacity costs
        3. Reduced collections costs and bad debt write-offs
        4. Improved customer retention
    - Energy security benefits;
    - Environmental benefits;
    - Economic development/competitiveness benefits;
    - Permanent peak electric and gas demand reductions; and
    - Long-term changes in customer behavior, attitudes, awareness, and knowledge of energy efficiency and energy efficiency technology.
- Enables the AWP Utilities to implement a weatherization program in an efficient manner; and
- Provides a comprehensive, consistent, quality-controlled, weatherization program serving severely energy-inefficient homes in utility service territories.

Further:

- The AWP Utilities individually conduct benefit/cost analyses of the AWP based on deemed savings estimates provided by Frontier Associates and evaluated by ADM Associates, compared to each utility's avoided energy and demand costs. The Utilities' analyses, and ADM's evaluation report, show that the AWP provides aggregate ratepayer benefits to utility customers.
- National and international research studies show that weatherizing severely energy inefficient homes provides considerable benefits to society in addition to energy and demand savings.

2.1.1 Program Budget, Savings & Participants

Table 3 – Program Budget, Savings, & Participants – 2014 Electric Utilities

2014 Portfolio Results Detail

	Cost			Savings (kWh)			Participants		
Electric Utility Name	Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%
Entergy	$ 1,051,392	$ 131,853	13%	1,693,982	229,868	14%	768	112	15%
SWEPCO	$ 417,000	$ 16,016	4%	433,780	31,154	7%	300	12	4%
OG&E	$ 80,771	$ 3,102	4%	100,822	3,141	3%	59	3	5%
Empire	$ 6,047	$ -	0%	10,446	0	0%	5	0	0%
			-			-			-
Regulatory	$ -	$ -							
	$ 1,555,210	**$ 150,971**	10%	**2,239,030**	**264,163**	12%	**1,132**	**127**	11%

Table 4 – Program Budget, Savings, & Participants – 2014 Natural Gas Utilities

2014 Portfolio Results Detail

	Cost			Savings (Therms)			Participants		
Natural Gas Utility Name	Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%
CenterPoint	$ 655,960	$ 110,693	17%	245,595	28,948	12%	620	113	18%
SourceGas	$ 120,000	$ 10,726	9%	35,161	2,453	7%	113	11	10%
AOG	$ 58,190	$ 3,174	5%	10,289	480	5%	55	3	5%
			-			-			-
Regulatory	$ -	$ -							
	$ 834,150	**$ 124,593**	15%	**291,045**	**31,881**	11%	**788**	**127**	16%

2.2 PROGRAM INFORMATION

2.2.1 Program Description

See the program description in Appendix B.

2.2.2 Program Highlights

- For program year 2014, 168 homes received energy efficiency audits and/or measures, which was 13% of the overall production goal for the year.
- Annual evaluated savings from homes treated in this period were 264,163 kilowatt-hours (kWh) and 31,881 natural gas therms for AWP utilities.
- These savings represent electric peak KWs of 0.9 per home and peak gas demand of 6.36 therms per home, on average.
- In 2014, payments by AWP Utilities for audits and weatherization through the AWP totaled $275,564**.**
- All but 11 of the co-payments were made on customers' behalf by the federally-funded DOE WAP. Non-utility co-payments for 2014 totaled $1,186,807.

- There were no co-payments from propane dealers or electric co-ops and municipals, which do not participate in the AWP. However, ADM calculated additional annual savings of 3,486 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 66,640 kWh from electric co-ops and municipals.
- Savings have been achieved very cost-effectively. Counting AWP utility costs, including AWP administrative costs, and assuming measure lives as determined for each measure by ADM, savings have been purchased by the AWP utilities at a lifetime cost of only 3.26 cents (3.26¢) per kWh and 24 cents (24¢) per therm.

2.2.3 Description of Participants

Participants in the AWP are residential customers of AWP Utilities living in severely energy-inefficient homes built before 1997 that meet three of seven efficiency criteria. There are no income eligibility criteria to participate. However, those participants eligible for the DOE WAP will have their required co-payments made by the WAP.

2.2.4 Program Events & Training

In 2014, a total of 147 members of the Weatherization Network and AWP Collaborative participated in program events and training. In addition, the PWC Collaborative spent a majority of the past year developing a uniform weatherization program as well as discussing quantification of non-energy benefits (NEBs) and the development of an energy-efficiency potential study.

- Weatherization Network personnel and contractors participated in 52 training sessions encompassing over 725 person-hours.
- Training included topics such as use of NEAT/MHEA audits, JAI/ECOS Software, Quality Control Training, health and safety issues, and key Weatherization Assistance Program issues.
- Network agencies as well as ACAAA participated in an all-day weatherization technical conference in early March to bring all stakeholders in to discuss the approach that should be taken to develop a uniform weatherization program.

- Network Agencies and ACAAA participated in 70 hours of PWC meetings and webinars throughout the year.

- ACAAA and CADC conducted training and planning sessions with Weatherization Network personnel, and CADC worked with individual agencies throughout the year.

2.2.5 Savings

According to ADM, evaluating data from Frontier Associates, annual savings to AWP utilities from homes treated in 2014 were 264,163 kilowatt-hours (kWh) and 31,881 natural gas therms. These savings represent electric peak KWs of 0.9 per home and peak natural gas demand of 6.36 therms per home. Frontier also reported additional annual savings of 3,486 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 66,640 kWh from electric co-ops and municipals.

2.2.6 Challenges & Opportunities

The AWP had overcome significant barriers to become a highly successful energy efficiency program. As described in previous ACAAA AWP Annual Reports to the Commission, obstacles were confronted during the Quick Start AWP in late 2007 through 2009, in creating this first-in-the-state joint effort among the utilities and the Network. Major challenges in 2014, as detailed above, were the agencies being directed by AEO to spend down LIHEAP funds allocated to the WAP before using other funding sources, such as utility AWP funds, and a lack of AWP services in some parts of the state due to only five of the six agencies doing AWP work in 2014. The challenge for 2015 AWP implementation will be to maximize the positive changes made by the AEO while continuing to provide consistent, high-quality service to customers and utilities through the AWP.

Periodic discussions among the weatherization collaborative along with monthly Frontier data call updates have helped the AWP to respond to problems as they arise and to address productivity challenges. Goals for 2015 include strengthening communication, collaboration, and coordination to achieve target results as well as improve data tracking and record keeping and updating marketing strategies.

Finally, as a collaborative effort, coordination among the seven AWP Utilities, the six Weatherization Network providers, CADC as the network administrator, the AEO as an external monitor, and AWP Utilities'

contractor Frontier Associates is in itself a challenge. Yet responding to and overcoming these obstacles in a collaborative fashion has set the foundation for achievement of substantial energy savings through the end of 2015 and for going forward with a statewide, uniform weatherization program in 2016.

2.2.7 Outlook for Continuation, Expansion, Reduction, or Termination

In collaboration with the AWP Utilities and the PWC, the Commission approved ACAAA's petition to continue the AWP through 2015. For 2015, goals and budgets will remain at 2014 levels.

There continues to be a severe and continuing need for this service by customers and an ability of the program to successfully achieve desired energy and demand savings when adequately funded and coordinated with WAP.

The Weatherization Network capacity will remain as an asset to the AWP. It will be important for the AWP to have sustained utility support and to implement approaches to attract customers who are not eligible for DOE WAP co-payment assistance to participate in the AWP, if their homes are eligible. The design of the statewide, uniform weatherization program incorporates the best elements of the AWP.

2.2.8 Planned or Proposed Changes to Program and/or Budget

There are no planned or proposed changes to the AWP and/or its budget for 2015. The AWP will be replaced by the uniform weatherization program in 2016 which will hopefully increase the number of residential customers served.

3.0 SUPPLEMENTAL REQUIREMENTS

3.1 Staffing

CADC employs two staff members who spend less than 30% of their time on the AWP. Other CADC and Weatherization Network staff and contractors involved in AWP activities spend less than 50% of their time on the AWP.

3.2 Stakeholder Activities

Since the design of the AWP is a coordinated, statewide program, input from many stakeholders is an integral component of the program. Regular meetings are held to present and resolve problems, share information, and train implementers. See the detailed report on training activities in the Workbook.

3.3 Information Provided to Consumers to Promote EE

During the auditor's initial visit to the AWP customer household, the network provides information on ways to save energy beyond the weatherization measures to be installed. Depending on the agency, this can be done verbally during the walk-through or through written materials that the auditor provides to the client. An example of the type of material provided is included as Appendix E.

4.0 APPENDICES

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B. AWP Program Description
C. Results of Customer Satisfaction Survey
D. Customer service response form
E Information provided to AWP customers

Appendix A

ADM Independent Evaluation Report

Evaluation of 2014 Arkansas Weatherization Program

Submitted to:

Arkansas Community Action Agencies Association
Arkansas Oklahoma Gas Corporation
CenterPoint Energy Arkansas
Oklahoma Gas and Electric
Southwestern Electric Power Company
Empire District Electric Company
Entergy Arkansas, Inc.
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Additionally, we would like to thank participating customers of the aforementioned utilities, the community action agencies, the Arkansas Community Action Agencies Association (ACAAA), and Frontier Associates staff for their cooperation and assistance throughout the evaluation.

We would also like to thank Independent Evaluation Monitor staff for their active involvement in providing thorough answers and clarification to the evaluation team when higher-level questions arose during the EM&V effort.

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1. Executive Summary

The purpose of this report is to provide a summary of the methodology and results for the evaluation of the 2014 Arkansas Weatherization Program (AWP). This evaluation was conducted by ADM Associates (referred to in this report as the Evaluators). This report provides the results of both the impact evaluation and process evaluation activities, presenting verified savings results and discussing changes and updates in the program since the prior program year.

As there have been few significant modifications to overall program structure and delivery since the prior program year, the process findings are mainly focused on assessing program performance characteristics, any changes in program delivery, and the program's responsiveness to prior evaluation recommendations. A comprehensive process evaluation can be found in the 2012 Arkansas Weatherization Program Evaluation Report.

1.1 Summary of Arkansas Weatherization Program

Program design and structure in 2014 remained consistent with the 2013 program year. The following provides a review of program design characteristics and operational procedures, noting any specific updates for 2014.

In 2014, the Arkansas Weatherization Program (AWP) provided residential energy audits and energy efficiency measure installations to homes whose residents are customers of one or more of the following investor owned utilities (IOUs):

- American Electric Power – Southwestern Electric Power Company (AEP-SWEPCO);
- Entergy Arkansas, Inc. (EAI);
- Oklahoma Gas and Electric (OG&E);
- Arkansas Oklahoma Gas Corporation (AOG);
- CenterPoint Energy (CenterPoint);
- SourceGas Arkansas (SGA); and
- Empire District Electric Company (EDEC).[6]

The program is offered in conjunction with the Department of Energy (DOE) Weatherization Assistance Program (WAP), which provides federal assistance to fund the customer co-payment in the AWP for income-qualified households. In Arkansas, the

[6] EDEC is a sponsoring IOU of the Arkansas Weatherization Program and has achieved savings through the program in past years, but did not have any projects completed in its service territory during 2014.

WAP is administered by the Arkansas Energy Office (AEO).[7] If the customer meets the eligibility requirements of the WAP, the weatherization project can be funded by both the WAP and the AWP in order to fully cover the project cost and eliminate the cost to the customer.[8] Customers who are not eligible for the WAP are required to provide their own co-pay in order to participate in the AWP and receive the audit and associated measures.

In 2014, 91% of participating AWP customers were eligible to have their projects partially funded through the WAP. This is consistent with prior years, where fewer than 10% of participants provided their own co-payment to participate in the AWP.

Rather than an income requirement, eligibility for the AWP is based on a set of criteria regarding customer residence energy efficiency. In order to qualify, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. There were no modifications to these criteria for the 2014 program year.

Local community action agencies work with customers to enroll in the program and determine AWP and WAP eligibility. In 2014, qualifying AWP projects were completed by one of five such agencies:

- Central Arkansas Development Council (CADC);
- Crowley's Ridge Development Council (CRDC);
- Crawford-Sebastian Community Development Council, Inc. (C-SCDC);
- Pine Bluff Jefferson County Economic Opportunities Commission, Inc. (PBJCEOC); and
- Community Action Program for Central Arkansas (CAPCA).

After the customer is approved and the in-home audit is performed, optimal energy efficiency measures for AWP (and WAP, for eligible customers) are identified through the use of National Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software. The measures implemented in participating homes during 2014 include:

- Ceiling, floor and wall insulation;
- Air infiltration reduction;
- Window replacement and storm window installation;
- Heating and air conditioning replacement;

[7] The administration of the WAP transitioned to the AEO from the Department of Human Services (DHS) during 2013.

[8] Eligibility for the Weatherization Assistance Program (WAP) is based on income thresholds, which increase with the number of residents in the home. A description of the WAP, along with the associated income requirements, can be found here: http://www.benefits.gov/benefits/benefit-details/1843.

- Water heater insulation jackets and pipe wrap;
- Refrigerator replacement;
- CFL retrofits; and
- Smart thermostats.[9]

The local agencies conduct onsite audits and install the necessary measures using their internal crews or subcontractors. Audit and installation crews record all relevant measure input data and report it to the Central Arkansas Development Council (CADC), who aggregates the information from each agency. Batches of data are then sent to Frontier Associates, the program database provider that manages the EnerTrek software tool. EnerTrek incorporates the onsite data into TRM savings formulas (and NEAT/MHEA values for measures not included in the TRM) to calculate *ex ante* savings for each measure. The resulting savings are made accessible to program utilities and EM&V contractors, who use EnerTrek database exports to conduct measure implementation and savings verification activities.

Table 1-1 identifies core program stages and includes key activities performed throughout the program process. The activities and stages shown for 2014 are fairly consistent with those of 2013 and prior years, with modifications to include additional details and clarifications regarding program procedures.

Table 1-1 Key Activities and Program Stages, 2014 Program Year

Program Stage	*Key Activities*
Program Design Planning	• Utilities set budgets and savings goals for the program year. • Frontier Associates and the participating agencies make any necessary modifications to data collection procedures or program delivery based on TRM changes or other program design changes. • Agencies plan their program activity based on expected WAP funding levels and planned AWP funding.
Training and Implementation Planning	• Community action agencies, contractors, and other program operations staff attend program-relevant training sessions (primarily for new contractor staff) • ACAAA, CADC, and local agencies discuss implementation and program updates (primarily to comply with TRM changes).
Program Promotion	• Agencies market the program to local customers who may provide a private co-pay. • Agencies enroll customers from the WAP wait list. • Utilities answer customer inquiries about the AWP or refer customers to their respective agencies.
Program Participation	• Customers apply for the AWP and home eligibility is determined. • WAP eligibility is determined. • Participants receive in-home audits and measures are identified.

[9] A complete list of all eligible program measures can be found in ACAAA Docket no. 07-079-TF, Attachment A (AWP Modified Program Design and Description).

Program Stage	*Key Activities*
	• Contractors install measures that are either stipulated based on NEAT or MHEA software or are agreed upon with the customer (depending on whether or not WAP funds are used for the co-pay).
Data Processing and Monitoring	• Measure costs and participant tracking data are collected by each agency and reported to CADC. • CADC provides periodic cost and participation updates to the utilities. • Frontier Associates receives implementation data from CADC and calculates *ex ante* savings • Frontier Associates sends savings data in batches to the utilities. • Utilities, ACAAA, Frontier Associates, and agencies have periodic discussions regarding program participation levels and other topics.

1.2 Evaluation Objectives

The evaluation of the 2014 Arkansas Weatherization Program (AWP) consisted of a program savings impact analysis and a limited process evaluation. These evaluation objectives were primarily focused on savings analysis and verification, as well as program updates and tracking of prior evaluation findings. Specifically, the evaluation activities conducted for the 2014 program year include:

- Review of deemed savings calculations. The Evaluators used the Arkansas Technical Reference Manual, Version 4.0 (TRM) to verify savings calculations for each implemented measure type in order to ensure that *ex ante* measure savings were properly calculated according to TRM protocols.[10]

- Tracking database and documentation review. The Evaluators conducted a comparative assessment of the AWP tracking database in order to evaluate tracking data modifications and improvements since the 2013 program year. Additionally, the Evaluators reviewed program documentation such as promotional materials, and the results of customer satisfaction surveys conducted by the participating community action agencies.

- On-site field verification. The Evaluators scheduled and conducted site visits to participant homes in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to verify home characteristics such as heating and water heating fuel type.

- Program staff interviews. Interviews were conducted with utility staff and implementation staff (members of ACAAA and CADC). These interviews provided insight into any recent program changes for 2014, updates in specific program

[10] Although EnerTrek calculated savings for the AWP in 2014 using protocols in TRM 3.0, the Evaluators referenced TRM 4.0 for verification purposes as it was the most current version of the TRM at the time of evaluation.

processes, potential future improvements to program operation, and overall 2014 program performance.

1.3 Summary of Findings

1.3.1 Field Verification Results

The Evaluators conducted onsite verification visits to 38 participant homes, supplemented by 10 telephone verifications for a total of 48 homes in the verification sample. These site visits were conducted in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to verify home characteristics such as heating and water heating fuel type.

The field and telephone verification activity showed that the weatherization measures had for the most part been installed in the quantities reported within program tracking data. Specific notes regarding the onsite and telephone verification findings include:

- **Contact Information:** All residences were located at the addresses provided within the tracking data. However, many of the telephone numbers listed in the tracking data appeared to be disconnected or incorrect. In total, 26 out of the 121 telephone numbers (22%) dialed by the Evaluators were found to be disconnected or incorrect during the site visit scheduling process. Contractors should endeavor to obtain the best available contact information from each customer, although it is possible that some customers disconnected their telephones or changed their telephone number since receiving the audit and measure installation.

- **Air Infiltration:** The Evaluators conducted blower door testing in 38 participant homes for the 2014 program year. Of these 38 homes, the CFM_{50} value measured during the verification visit was within 10% of the reported value for 18 (47%) homes. The Evaluated CFM_{50} value was more than 10% greater than the Reported CFM50 value for 17 homes. Overall, the Evaluated CFM_{50} value was greater than the Reported CFM_{50} value for 25 of the 38 homes (66%).

- **Window Replacement:** The Evaluators were able to locate and verify all instances of reported window replacement with the exception of one home. For this home, the tracking data indicated that one window had been replaced, but during the verification visit the homeowner stated that the contractors had not replaced any windows. As contractors typically replace multiple windows in a home when conducting window replacement, it is likely that this reported instance was a data entry or database error. For the window replacements that were successfully verified, the Evaluators found the SHGC, U-Factor, and window area listed in the tracking data to be accurate.

- **CFLs:** All reported instances of 13W CFL installation were verified. For 18W CFLs, the Evaluators verified 375 of the 441 CFLs (85%) represented by sampled

participants. In most cases, the difference between reported and evaluated CFL counts was fairly minor and was likely due to customer removal of bulbs. However in one case, the tracking data reported that 76 CFLs had been installed in a single home, and the Evaluators were able to identify only 14 CFLs. The number of reported CFLs for this home exceeds the typical number of bulb sockets in a single-family residence, and is likely a data collection or EnerTrek error.[11] All verified CFLs matched the wattage and lumen range reported in the EnerTrek tracking data.

- **Attic Insulation:** All reported instances of attic insulation were verified. There were no significant differences between reported pre-installation R values and evaluated pre-installation R values. All homes met the TRM requirement of an R-38 post-installation value. There were no significant differences between reported square footage and evaluated square footage.
- **Water Heater Jacket and Pipe Wrap:** The Evaluators were able to verify all but one instance of reported water heater pipe wrap; one customer had removed their water heater pipe wrap. The reported instance of water heater jacket installation was successfully verified.
- **Gas Heat Replacement:** All reported instances of gas heat replacement were verified.
- **Smart Thermostat:** The reported instance of smart thermostat installation was verified.
- **Refrigerator Replacement:** All reported instances of refrigerator replacement were verified.
- **Direct Vent Heater:** All reported instances of direct vent heater installation were verified.

Overall, the results of the verification activity suggest that measures are for the most part installed in the quantities reported in program tracking data, with a few exceptions. These findings are fairly consistent with the results of the 2012 onsite verification activity, although there are some emerging issues (e.g. increased discrepancies in blower door testing results, and issues with customer contact information) that should be addressed moving forward.

1.3.2 Summary of Ex Post Net Savings

For measures implemented through the 2014 program, savings verification was performed according to methodologies described in TRM V4.0. The following table identifies the sections in the TRM that were used for verification of measure-level savings

[11] This home was not serviced by a participating electric utility, so the electric savings from these erroneously reported bulbs did not affect the *ex post* savings for any of the AWP electric IOUs.

under the Arkansas Weatherization Program. The savings for smart thermostats and storm windows were calculated through NEAT/MHEA, and these measures do not have an associated section in the TRM. As these measures accounted for a very small portion of program savings,[12] the *ex ante* savings values were applied as *ex post* savings for these two measures. The savings for all other measures were calculated and verified using protocols and equations specified in the following sections of TRM V4.0:

Table 1-2 TRM Sections by Measure Type

Measure	*TRM Version*	*Section in TRM*
Air Infiltration	4.0	2.2.9
Ceiling Insulation	4.0	2.2.2
Central AC Replacement	4.0	2.1.6
ENERGY STAR® Windows	4.0	2.2.7
Floor Insulation	4.0	2.2.4
Gas Furnace Replacement	4.0	2.1.3
Lighting Efficiency	4.0	2.5.1
ENERGY STAR® Refrigerator	4.0	2.4.3
Smart Thermostat	N/A	N/A
Storm Windows	N/A	N/A
Direct Vent Heaters	4.0	2.1.1
Wall Insulation	4.0	2.2.3
Water Heater Jackets	4.0	2.3.2
Water Heater Pipe Insulation	4.0	2.3.3
Window AC	4.0	2.1.10

Table 1-3 and Table 1-4 present *ex post* net savings for electric utilities and gas utilities, respectively. Table 1-5 presents the *ex post* net savings by measure, including measure-level realization rates (RR). The net-to-gross ratio for the AWP is 1, meaning that net savings are equal to gross savings.[13]

[12] Smart thermostats and storm windows accounted for less than .03% of 2014 program year savings.

[13] The Evaluators conducted a net-to-gross assessment of the program during the 2012 program year in order to determine the likelihood of significant free-ridership or savings spillover. Due to program design factors, target customer segment characteristics, and lack of participant spillover, the Evaluators determined the net-to-gross ratio for the AWP to be 1. This determination has been carried over and applied to the 2014 program year.

Table 1-3 Ex Post Net Savings by Electric Utility

Electric Utility	*# of Homes*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AEP-SWEPCO	12	8.40	31,154.13	461,148.41
EAI	112	105.99	229,868.21	3,271,557.30
OG&E	3	0.63	3,140.96	36,642.36
Non-IOU	41	37.60	66,640.04	860,087.50
Total	168	152.63	330,803.34	4,629,435.56

Table 1-4 Ex Post Net Savings by Gas Utility

Gas Utility	*# of Homes*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*
AOG	3	8.33	479.54	9,590.78
CenterPoint	113	742.24	28,948.28	416,134.08
SGA	11	56.80	2,452.89	34,668.20
Non-IOU	41	76.19	3,485.79	58,313.25
Total	168	883.56	35,366.50	518,706.31

Table 1-5 Ex Post Net Savings by Measure Type – Overall

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*
Air Infiltration	56.32	126,484.93	1,391,334.18	620.40	20,546.88	226,015.67
Ceiling Insulation	56.50	97,901.52	1,958,030.48	182.26	10,530.49	210,609.71
Central AC Replacement	3.64	8,850.00	168,150.00	-	-	-
Direct Vent Heater	-	-	-	9.04	588.49	11,769.78
Duct Sealing Installation	-	-	-	-	-	-
Floor Insulation	(0.07)	(441.83)	(8,836.56)	0.97	144.35	2,886.92
Gas Central Replacement	-	-	-	25.00	1,632.58	32,651.59
Refrigerator Replacement	0.22	1,536.52	26,120.82	-	-	-
Residential Lighting	10.77	66,213.86	506,768.48	-	(0.40)	(3.02)
Smart Thermostat	-	105.00	1,260.00	-	358.00	4,296.00
Storm Windows	0.02	29.70	594.00	3.83	100.50	2,010.00
Wall Insulation	0.81	1,145.75	22,915.00	6.08	332.30	6,645.94
Water Heater Insulation	0.01	68.00	884.00	0.04	22.02	286.26
Water Heater Pipe Insulation	0.32	1,096.19	12,058.08	0.71	98.36	1,278.74
Window AC	1.05	643.90	6,760.96	-	-	-
Window Replacement	23.05	27,169.81	543,396.12	35.23	1,012.94	20,258.74
Total	152.63	330,803.34	4,629,435.56	883.56	35,366.50	518,706.31

Table 1-6 presents annual therms and kWh realization rates by measure category. These realization rates are presented at the program level, and individual utility realization rates may vary from those presented in this table.

Table 1-6 Gas and Electric Realization Rates by Measure Type

Measure	*kWh Realization Rate*	*Therms Realization Rate*
Air Infiltration	127%	153%
Ceiling Insulation	106%	162%
Central AC Replacement	100%	-
Direct Vent Heater	-	95%
Duct Sealing Installation	0%	-
Floor Insulation	-72%	25%
Gas Central Replacement	-	100%
Refrigerator Replacement	49%	-
Residential Lighting	101%	28%
Smart Thermostat	100%	100%
Storm Windows	100%	100%
Wall Insulation	63%	76%
Water Heater Insulation	100%	100%
Water Heater Pipe Insulation	96%	94%
Window AC	100%	-
Window Replacement	102%	98%
Overall	110%	142%

1.3.3 Summary of Savings Verification Findings

Ex post savings were calculated through TRM verification of EnerTrek inputs and *ex ante* savings values. Any instances of discrepancies between *ex ante* and *ex post* savings were due to one of two issues:

- Difference in TRM: EnerTrek calculated measure savings in 2014 using TRM 3.0, and the Evaluators conducted savings verification using TRM 4.0. There were differences in input assumptions, measure parameters, and savings equations between the two TRM versions for some measures.

- Calculation Error: Any difference in interpretation of TRM protocols, mathematical errors, or data entry errors may cause *ex ante* savings to be higher or lower than *ex post* (verified) savings.

The realization rate for most measures was very close to 100%, and the Evaluators found that the majority of discrepancies between *ex ante* and *ex post* savings were due to differences between TRM V3.0 and TRM V4.0 rather than due to calculation errors.

The following list identifies measure categories where there were significant differences between *ex ante* and *ex post* savings, and specifies whether this was due to differences in TRM versions or due to calculation errors:

- Ceiling Insulation
    - Difference in TRM: High overall electric and gas realization rates were due to differences in TRM versions. TRM V4.0 is more granular than TRM V3.0 with regard to the pre-implementation R-value. One effect of this is higher savings for homes that did not have ceiling insulation initially.
- Floor Insulation
    - Difference in TRM: Low overall electric and gas realization rates were due to differences between TRM versions. TRM V3.0 specifies positive kWh savings for floor insulation, while TRM V4.0 implements an electric savings penalty for homes with gas heat and air conditioning. The simulation procedures used for this measure in TRM V4.0 identified negative electric savings, likely caused by the floor insulation acting as a barrier to ground cooling effects. This would cause the home temperature to be higher during cooling months, likely resulting in increased air conditioner usage.
- Wall Insulation
    - Difference in TRM: Low overall electric and gas realization rates were due to differences between TRM versions. TRM 4.0 specifies lower deemed savings per square foot.
- Residential Lighting
    - Difference in TRM/Calculation Error: Low overall electric and gas realization rates were due to differences between TRM versions and possible EnerTrek calculation issues. CFL annual kWh savings in EnerTrek may have been calculated as an increment of lifetime savings, which takes into account future baseline changes that should not affect first-year kWh savings.
- Air Infiltration
    - Difference in TRM/Calculation Error: High overall electric and gas realization rates are partially due to differences between TRM versions and likely due to calculation errors within *ex ante* savings. TRM V4.0 specifies minimum and maximum caps for CFM_{50} values and specifies different deemed savings values for each weather zone, but the Evaluators were unable to duplicate the EnerTrek *ex ante* savings values using TRM V3.0. The analysis resulted in a wide range of realization rates, both high and low, across the participant population.
- Refrigerator Replacement

- Calculation Error: A low electric realization rate was primarily due to two instances of substantial *ex ante* overestimation of savings, where one refrigerator was listed with *ex ante* savings of approximately 1,000 kWh, and another with *ex ante* savings of approximately 700 kWh.

Detailed savings verification findings can be found in Sections 2.8 and 2.9 of this report.

1.3.4 Responsiveness to Prior Year Recommendations

Table 1-7 summarizes the status of recommendations identified in the 2013 process evaluation and impact evaluation of the Arkansas Weatherization Program. While there have been advances in some areas such as improved communication among utilities and stakeholders, fewer errors in tracking exports, and increased compliance with TRM requirements, several of the issues have persisted through the 2014 program year.

Table 1-7 Status of Recommendations from 2013 Program Year

Issue	***Consequences***	***Recommendation***	***Program Response***	***Status of Issue***
There have been delays in database finalization due to uncertainties in data interpretation and requirements between CADC and Frontier.	Reduces accessibility to database for utilities Delays savings reporting and may cause inaccurate reports	Resolve issues early in 2014 program year, including data interpretation issues, so that multiple data and database revisions are not necessary.	There appear to have been fewer issues between Frontier and CADC in terms of gathering the required data fields. However, updates to the EnerTrek database, combined with continued delays in receiving data from some agencies resulted in several tracking data revisions and delays.	Partially addressed
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	Potential lost data Potential delays in data transfer if additional data are needed	Agencies should maintain electronic records of all collected audit, implementation, and verification data.	Agencies continue to maintain hardcopy records of data that are not required for savings analysis. Some data are not available in electronic format.	Persists
Communication among utilities and agencies is limited.	Causes difficulties in utility-agency coordination	Recommendation 1: Hold introductory meetings between utilities and the remaining six agencies in order to develop familiarity and identify key contact persons, establish communication lines Recommendation 2: Develop an organizational chart displaying roles, responsibilities, and contact persons for each entity (utilities, agencies, ACAAA, etc.)	Communication among utilities and other stakeholders has improved substantially throughout the meetings and discussions surrounding development of the Unified Weatherization Program Utilities report that roles and responsibilities have for the most part been clarified and that a formal organizational chart is not likely necessary at this point.	Addressed
Some data required for TRM 2.0 and 3.0 do not appear to have been collected.	Creates difficulties in savings verification May result in inaccurate *ex ante* savings estimates if insufficient inputs are used	Ensure that the data collection forms and database are compliant with relevant TRM requirements to the extent possible based on budget constraints.	EnerTrek was updated to contain nearly all necessary fields for calculation of savings under TRM V3.0. Although some inputs were not collected for the first few months of the year, Frontier developed reliable and conservative assumptions in order to allow for savings analysis.	Addressed

Issue	*Consequences*	*Recommendation*	*Program Response*	*Status of Issue*
Utilities are not aware of project details until end of year.	Limits utility ability to plan for annual reporting Limits utility awareness of program performance	Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.	The level of detail in monthly and quarterly reports to the utilities from CADC and other agencies has not increased. Measure counts and specific participant information have not been included.	Persists
EnerTrek contains erroneous assumptions for individual measure algorithms (air infiltration, attic insulation, window replacement).	Results in inaccurate *ex ante* savings (in this case savings were highly overestimated) Decreases program realization rates	Frontier should perform thorough quality assurance practices and verify that EnerTrek calculations comply with TRM algorithms.	Calculation errors appear to have decreased for 2014, although there were new errors for a few measures such as refrigerator replacement and air infiltration.	Partially addressed
TRM estimates for Therms savings substantially exceed regression analysis results.	TRM formulas may be inaccurately estimating Therms savings.	Conduct further research into TRM industry standards for weatherization, or perform a more in-depth billing analysis for a larger population, prior to implementing TRM changes for air infiltration or insulation.	No further impact research has been conducted for the AWP, and the billing analysis approach was not used for 2014. Difficulties in isolating the effects of individual measures within regression analysis create challenges for updating individual measure savings algorithms.	Persists

1.3.5 Summary of Conclusions and Recommendations

The Arkansas Weatherization Program was evaluated for overall effectiveness, performance, and design, and the Evaluators developed conclusions with consideration of the seven comprehensiveness factors developed by the Arkansas Public Service Commission. After reviewing the Arkansas Weatherization Program for 2014, the Evaluators provide the following conclusions:

Continued WAP Reliance Issues: As with prior years, utility, ACAAA, and CADC staff acknowledged the challenges that have emerged and persisted due to the AWP's relationship with the Weatherization Assistance Program (WAP).

Ideally, this arrangement would use utility funds to efficiently leverage federal funding and substantially increase the number of weatherization projects that the agencies are able to perform. However, the AWP's inherent link to the WAP has continued to result in performance issues due to federal funding reductions and statewide program reorganization. Additionally, the participating agencies were directed to prioritize LIHEAP funding over AWP funding when implementing weatherization projects, which is a key barrier to AWP program activity.

The transfer of the WAP to the AEO does not appear to have mitigated any of the AWP's operational or performance issues. It is possible that a more effective working relationship between the AEO and AWP staff will emerge in the future, but thus far the AWP has not been able to consistently leverage funds through the WAP.

Decreasing Program Activity: The number of participants and the resulting savings levels for the AWP have steadily decreased since the 2011 program year. This decline in program activity is likely due to several issues including variable agency engagement in weatherization services, inconsistent availability of WAP funding, and insufficient interest from private co-pay customers. Although program staff has made efforts to mitigate each of these issues in recent years, the major operational challenges affecting the program have not been sufficiently addressed. When asked about potential future participation, utility staff stated that they do not expect program performance to increase, and ACAAA and CADC staff explained that future program success depends heavily on WAP reliability and organization.

Upcoming Unified Weatherization Program: The new weatherization framework developed by the utilities and other stakeholders will establish statewide weatherization procedures and services, starting at the beginning of the upcoming program cycle.[14] Utility staff reported that they anticipate that this Unified Weatherization Program will be a more effective method of meeting the state's weatherization needs. Additionally, utility staff noted that the collaborative relationship among utilities has improved during the

[14] As 2015 will be another bridge year for the program, the next program cycle will begin, at the earliest, in January of 2016.

development of the new framework. This is not a direct result of the AWP, but does address the utility communication issue discussed in prior evaluation reports.

Improved Tracking Data Procedures: Frontier Associates has been fairly responsive to past evaluation recommendations and was able to provide utilities with batches of EnerTrek data throughout the program year. Additionally, Frontier Associates corrected the errors that the Evaluators identified in the 2013 evaluation report. Although the Evaluators identified several additional tracking data issues for the 2014 program year, the magnitude and frequency of these issues appears to have decreased. With regard to TRM compliance, Frontier Associates was able to accurately update the EnerTrek system as per TRM V3.0 protocols. There were some late revisions and corrections within EnerTrek after final data had been provided to the utilities, but these were fairly minor.

Continued Limitations of Program Activity Reports: Utility staff stated that the quarterly program activity reports that they receive from CADC have not yet included measure-level information such as measure costs and counts, or specific customer information. It was previously recommended that these details be included in the periodic reports, and CADC noted that it would be possible to do so, but the utilities continued to express their need for additional details throughout the program year. These details would be useful for planning purposes, and would allow the utilities to roughly estimate their expected savings during the year rather than waiting until the EnerTrek reports are distributed.

Continued TRM Update Issues: While the current version of the tracking database contains adequate calculations and inputs for TRM V3.0, the processes of uploading data to the database and updating database structure have continued to be time-consuming and costly. In addition to administrative costs, the time and budget required to retroactively update the database can create barriers to program performance.

In order to fully comply with any future TRM updates, EnerTrek will have to be flexible enough to receive updates without disrupting the data input process or delaying savings reporting. If the update process becomes too costly or time-consuming, it may be more efficient to only update the inputs for the highest-savings measures and use existing inputs for the remaining measures. This may affect program realization rates, but will not affect program net savings as the Evaluators would calculate savings as per the most current TRM.

Weatherization Messaging Issues: In order to assess current program promotion and informational resources, the Evaluators reviewed each utility and agency website for information regarding the AWP. All of the participating utilities currently have a section on their websites describing the program, or providing a link to the website of their local community action agency. However, after reviewing the specific program information provided, the Evaluators found that several utilities provide or link to documents that list more service providers than are currently eligible for weatherization services. Thus, it appears that these program materials are out-of-date.

Upon reviewing the websites of the six participating community action agencies, the Evaluators found that five out of the six agencies provide information about the WAP but do not discuss the AWP. These five agencies describe weatherization as an income-qualified service, but do not state that there is no income requirement for the AWP or that customers are allowed to provide their own co-payment under this program. This may discourage many prospective participants who are not eligible for enrollment in the WAP from considering the AWP, and may have a negative effect on the number of potential private co-pay customers that are aware of the program.

Based on these conclusions and other findings, the Evaluators provide the following recommendations:

Actively Work with AEO to Develop Program Coordination: As the AWP is closely tied to the operations and performance of the WAP, it is essential for the WAP to acknowledge the AWP as a viable leveraging opportunity. Additionally, maintaining consistency between the WAP and AWP where possible (e.g. with auditing software) will likely increase agency engagement in the AWP and will reduce data collection and reporting issues moving forward. The Evaluators recommend that CADC continue to discuss the existing program issues with AEO staff, and make efforts to create a mutually beneficial relationship.

Resolve Minor Tracking Data Issues: The Evaluators identified several minor issues within program tracking data for the 2014 year. This includes missing *ex ante* savings for some CFLs, missing ages of pre-existing units, and apparent calculation errors for air infiltration and refrigerator replacement savings. The Evaluators recommend resolving these issues in order to maximize potential program savings and maintain expected measure-level realization rates. These issues are further discussed in Sections 2.8 and 3.6 of this report.

Update Program Documentation on Utility and Agency Websites: The Evaluators found that several utilities provide or link to program documents that are out-of-date. The Evaluators recommend that the utilities provide links to updated program documents or include a note that informs customers of the currently active agencies.

Additionally, the Evaluators found that five out of the six agencies provide information about the WAP but do not discuss the AWP. These five agencies describe weatherization as an income-qualified service, but do not state that there is no income requirement for the AWP or that customers are allowed to provide their own co-payment under this program. The Evaluators recommend that each of the participating community action agencies update their websites to include information regarding the AWP, including information clarifying that the AWP does not have an income requirement.

Maintain Electronic Records: As mentioned in the prior report, it would be beneficial for each agency to collect and maintain accessible electronic records of any data that may be requested by Frontier. Alternatively, CADC would aggregate the data from each

agency and store it in a centrally accessible way. Situations where there are implementation, audit, or verification data that only exist in hardcopy format at the end of the program year should be avoided. This would ensure that all relevant data are stored in a single location, and would likely reduce the turnaround time for data requests.

Increase Level of Detail in Utility Updates: As with the prior program year, utility staff reported that the updates they receive from CADC regarding program performance are mainly limited to participant counts and overall costs. Utility staff are not aware which customers participated in the program or which measures were installed until the end of the program year. CADC should increase the level of detail within these reports and include participant names, addresses, measure counts, and other information if possible. This will allow the utilities to identify participants, to understand more about how the program is performing, and to potentially estimate preliminary savings.

Investigate Air Infiltration Reduction Procedures: As discussed in Section 2.6.1 of this report, the Evaluators identified discrepancies between reported air infiltration leakage rates and verified air infiltration leakage rates. In order to potentially address this issue or identify the cause of these discrepancies, the Evaluators provide the following recommendations:

- Include itemized air infiltration measures in tracking data: Thus far, the tracking data have not included information regarding what air sealing measures were installed (e.g. door sweeps, window sealing) in each home, or where they were installed (e.g. back door, bathroom window). Including this information in the program tracking data would allow the Evaluators to determine whether a discrepancy between reported and evaluated leakage could be due to measures becoming damaged, or customers removing measures.
- Include any air infiltration field notes for each home: Due to situational residence characteristics such as whether a fireplace flue is open or closed, or whether the homeowner did not allow the contractor to close a certain window, it is sometimes difficult to recreate the testing conditions that were present for the contractor measurement. Including information regarding any notable characteristics of the testing conditions that should be recreated during the verification process will minimize the potential for situational discrepancies.

Additionally, the Evaluators offer to have a discussion with CADC and the other agencies and their contractors regarding the methodology used during blower door testing in order to ensure that testing is conducted consistently among agencies, and between the agencies and the Evaluators.

Table 1-8 Recommendations from 2014 Program Year Evaluation

Issue	Consequences	Recommendation
Many AWP operational and performance issues are related to WAP operations and WAP requirements for community action agencies.	Restricts agency participation in AWP May create inconsistencies in data collection, leading to potential errors for the AWP	CADC should continue to make efforts to work with the AEO in developing a mutually beneficial working relationship, and maintain consistency between the two programs where feasible.
There were minor tracking data errors such as missing *ex ante* savings, calculation errors, and other missing fields in some cases.	Potentially lost savings Skewed measure-level realization rates	Resolve these tracking data issues for the 2015 program year.
Some utilities provide or link to program documents that are out-of-date. Most of the participating agencies do not discuss the AWP on their websites, and frame weatherization as an income-qualified service.	Customers may gain inaccurate information regarding service providers and other details. May reduce program interest from private co-pay customers.	The utilities should review their website materials and provide links to updated program documentation if possible. The agencies should provide information regarding the AWP on their websites, and explain that the program does not have an income level requirement.

Issue	Consequences	Recommendation
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	Potential lost data Potential delays in data transfer if additional data are needed	Agencies should maintain electronic records of all collected audit, implementation, and verification data.
Periodic program activity updates to the utilities do not include measure level cost data or measure counts.	Limits utility ability to plan for annual reporting Limits utility awareness of program performance	Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.
The reported air infiltration leakage rates appear skewed downward, based on the Evaluators' site visits.	Possible issues with measure implementation or data collection Possible discrepancies between implementation and verification that will lead to skewed realization rates.	1: Include itemized air infiltration measures in the tracking data so that the Evaluators are able to verify individual measure elements 2: Include any field notes related to the blower door test in the tracking data so that the Evaluators may more accurately recreate the testing conditions 3: Discuss air infiltration testing procedures with the Evaluators in order to ensure that the testing methodologies are consistent among agencies, their contractors, and the Evaluators.

1.4 Report Organization

The report is organized as follows:

- Chapter 2 presents the impact findings and discusses the methods used for, and the results obtained from, estimating gross and net savings for the program;
- Chapter 3 presents the results of the process evaluation tasks and additional program findings; and
- Chapter 4 presents key conclusions and recommendations from the evaluation of the program.

2. Impact Evaluation Findings

This chapter presents the results of the gross savings verification and savings calculation review for the Arkansas Weatherization Program (AWP) in the 2014 program year.

2.1 Glossary of Terms

As a first step to detailing the evaluation methodologies, the Evaluators provide a glossary of terms to follow:

- *Ex Ante Savings* – Energy savings as determined and reported by program implementers/sponsoring utilities prior to evaluation by EM&V contractor
- *Ex Post Gross Savings* – Energy savings as determined by the EM&V contractor through engineering analysis, statistical analysis, and/or onsite verification
    - *Gross Realization Rate* – Ratio of *Ex Post* Gross Savings / *Ex Ante* Savings
- *Ex Post Net Savings* – *Ex Post* Gross savings x Net-to-Gross Ratio
    - *Net-to-Gross Ratio (NTGR)* = (1 – Free-Ridership % + Spillover %), also defined as *Ex Post* Net Savings / *Ex Post* Gross Savings[15]
    - *Free-Ridership* – Percentage of participants who would have implemented the same energy efficiency measures in a similar timeframe absent the program
    - *Spillover* – Savings generated by a program that are not incentivized. Examples of this include a customer that is introduced to energy efficiency through the program and due to this undertakes other projects for which they do not receive an incentive.
    - *Net Realization Rate* = Ratio of *Ex Post* Net Savings / *Ex Ante* Savings

2.2 Summary of Ex Ante Savings

The Arkansas Weatherization Program is designed to use both electric and gas utility funds to assist customers with the cost of the in-home audit and energy efficient measures. Table 2-1 presents the overall *ex ante* savings by measure. These values are based on the claimed savings values within the EnerTrek software tool. Exports of these data were provided to the Evaluators for analysis and verification purposes.

[15] The net-to-gross ratio for the AWP in 2014 is 1, thus 100% of gross savings are counted as net savings.

Table 2-1 Ex Ante Savings by Measure Type – Overall

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
Air Infiltration	43.20	99,845.91	329.58	13,458.63
Ceiling Insulation	47.06	92,006.66	104.96	6,518.98
Central AC Replacement	3.64	8,850.00	-	-
Direct Vent Heater	-	-	9.52	619.96
Duct Sealing Installation	0.08	469.82	-	-
Floor Insulation	-	614.19	7.35	570.21
Gas Central Replacement	-	-	25.00	1,632.58
Refrigerator Replacement	0.44	3,131.38	-	-
Residential Lighting	10.49	65,291.45	-	(1.42)
Smart Thermostat	-	105.00	-	358.00
Storm Windows	0.02	29.70	3.83	100.50
Wall Insulation	0.41	1,827.62	7.49	439.59
Water Heater Insulation	0.01	68.00	0.04	22.02
Water Heater Pipe Insulation	0.33	1,140.97	0.75	105.01
Window AC	1.05	643.90	-	-
Window Replacement	18.65	26,644.48	45.29	1,038.86
Total	125.38	300,669.08	533.80	24,862.91

2.2.1 Ex Ante Savings for Electric Utilities

The electric utilities with participating homes in the AWP during 2014 were AEP-SWEPCO, EAI, and OG&E. Table 2-2 presents the savings results of the evaluation of the 2014 AWP for electric utilities.

Table 2-2 Ex Ante Savings by Electric Utility

Electric Utility	*# of Homes*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AEP-SWEPCO	12	7.00	23,603.85
EAI	112	87.11	210,514.92
OG&E	3	.70	3,938.89
Non-IOU	41	30.57	62,611.42
Total	168	125.38	300,669.08

Table 2-3 through Table 2-5 summarize the *ex ante* savings by measure for each electric utility. The "Non-IOU" category refers to savings that were achieved as a result of program services, but were not attributable to the investor-owned utilities (IOUs) that fund the Arkansas Weatherization Program.

Table 2-3 Ex Ante Savings by Measure Type – AEP-SWEPCO

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
Air Infiltration	1.52	6,959.83
Ceiling Insulation	2.68	7,874.88
Central AC Replacement	-	-
Direct Vent Heater	-	-
Duct Sealing Installation	-	-
Floor Insulation	-	267.96
Gas Central Replacement	-	-
Refrigerator Replacement	0.09	681.32
Residential Lighting	0.77	4,072.09
Smart Thermostat	-	-
Storm Windows	0.01	15.70
Wall Insulation	0.22	725.22
Water Heater Insulation	-	-
Water Heater Pipe Insulation	0.03	88.07
Window AC	0.21	114.20
Window Replacement	1.47	2,804.58
Total	7.00	23,603.85

Table 2-4 Ex Ante Savings by Measure Type - EAI

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
Air Infiltration	28.83	74,550.21
Ceiling Insulation	35.26	68,905.16
Central AC Replacement	2.26	5,701.00
Direct Vent Heater	-	-
Duct Sealing Installation	0.08	469.82
Floor Insulation	-	159.98
Gas Central Replacement	-	-
Refrigerator Replacement	0.31	2,254.66
Residential Lighting	6.25	38,307.44
Smart Thermostat	-	79.00
Storm Windows	0.00	7.80
Wall Insulation	-	-
Water Heater Insulation	0.01	68.00
Water Heater Pipe Insulation	0.28	963.76
Window AC	0.84	529.70
Window Replacement	12.98	18,518.40
Total	87.11	210,514.92

Table 2-5 Ex Ante Savings by Measure Type – OG&E

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
Air Infiltration	0.24	2,770.85
Ceiling Insulation	0.34	524.06
Central AC Replacement	-	-
Direct Vent Heater	-	-
Duct Sealing Installation	-	-
Floor Insulation	-	-
Gas Central Replacement	-	-
Refrigerator Replacement	-	-
Residential Lighting	0.12	643.98
Smart Thermostat	-	-
Storm Windows	-	-
Wall Insulation	-	-
Water Heater Insulation	-	-
Water Heater Pipe Insulation	-	-
Window AC	-	-
Window Replacement	-	-
Total	0.70	3,938.89

Table 2-6 presents the *ex ante* electric savings that were not associated with any IOU. These *ex ante* savings are attributable to municipal utilities, co-op utilities, or other energy providers. These savings are not attributed to any specific program sponsoring utility, and are provided for reference only.

Table 2-6 Ex Ante Savings by Measure Type – Non-IOU (Electric)

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
Air Infiltration	12.61	15,565.02
Ceiling Insulation	8.79	14,702.56
Central AC Replacement	1.38	3,149.00
Direct Vent Heater	-	-
Duct Sealing Installation	-	-
Floor Insulation	-	186.24
Gas Central Replacement	-	-
Refrigerator Replacement	0.03	195.40
Residential Lighting	3.35	22,267.95
Smart Thermostat	-	26.00
Storm Windows	0.00	6.20
Wall Insulation	0.19	1,102.40
Water Heater Insulation	-	-
Water Heater Pipe Insulation	0.02	89.15
Window AC	-	-
Window Replacement	4.20	5,321.50
Total	30.57	62,611.42

2.2.2 Ex Ante Savings for Gas Utilities

The participating gas utilities are AOG, CenterPoint, and SGA. Table 2-7 presents the savings results of the evaluation of the 2014 AWP for gas utilities.

Table 2-7 Ex Ante Savings by Gas Utility

Gas Utility	*# of Homes*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
AOG	3	8.70	523.43
CenterPoint	113	441.54	20,137.27
SGA	11	43.13	2,323.60
Non-IOU	41	40.43	1,878.61
Total			

Table 2-8 through Table 2-10 summarize the *ex ante* savings by measure for each gas utility. The "Non-IOU" category refers to savings that were achieved as a result of program services, but were not attributable to the investor-owned utilities (IOUs) that fund the Arkansas Weatherization Program.

Table 2-8 Ex Ante Savings by Measure Type - AOG

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
Air Infiltration	-	-
Ceiling Insulation	2.86	181.07
Central AC Replacement	-	-
Direct Vent Heater	-	-
Duct Sealing Installation	-	-
Floor Insulation	-	-
Gas Central Replacement	1.63	108.51
Refrigerator Replacement	-	-
Residential Lighting	-	(0.02)
Smart Thermostat	-	-
Storm Windows	-	-
Wall Insulation	3.19	209.75
Water Heater Insulation	-	-
Water Heater Pipe Insulation	-	-
Window AC	-	-
Window Replacement	1.02	24.13
Total	8.70	523.43

Table 2-9 Ex Ante Savings by Measure Type – CenterPoint

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
Air Infiltration	288.54	11,752.58
Ceiling Insulation	87.14	5,389.53
Central AC Replacement	-	-
Direct Vent Heater	6.68	434.90
Duct Sealing Installation	-	-
Floor Insulation	-	-
Gas Central Replacement	16.02	1,033.81
Refrigerator Replacement	-	-
Residential Lighting	-	(1.19)
Smart Thermostat	-	305.00
Storm Windows	3.25	79.00
Wall Insulation	4.30	229.84
Water Heater Insulation	0.02	11.30
Water Heater Pipe Insulation	0.67	93.65
Window AC	-	-
Window Replacement	34.93	808.85
Total	441.54	20,137.27

Table 2-10 Ex Ante Savings by Measure Type – SourceGas

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
Air Infiltration	25.29	1,072.90
Ceiling Insulation	4.80	344.58
Central AC Replacement	-	-
Direct Vent Heater	0.22	13.68
Duct Sealing Installation	-	-
Floor Insulation	5.71	443.49
Gas Central Replacement	5.22	348.16
Refrigerator Replacement	-	-
Residential Lighting	-	(0.11)
Smart Thermostat	-	41.00
Storm Windows	0.59	17.10
Wall Insulation	-	-
Water Heater Insulation	0.01	7.34
Water Heater Pipe Insulation	0.05	7.23
Window AC	-	-
Window Replacement	1.24	28.22
Total	43.13	2,323.60

Table 2-11 presents the *ex ante* gas savings that were not associated with any AWP IOU. As there are few non-IOU gas utility providers in the state of Arkansas, the "non-IOU" *ex ante* gas savings may represent propane customers or possibly tracking database errors that claim gas savings for homes that are not serviced by a gas utility. Therefore, Table 2-11 is a reflection of the non-IOU *ex ante* gas savings that are claimed within the tracking system, and these savings are not applicable to any specific service provider.

Table 2-11 Ex Ante Savings Values by Measure Type – Non-IOU (Gas)

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*
Air Infiltration	15.74	633.15
Ceiling Insulation	10.16	603.80
Central AC Replacement	-	-
Direct Vent Heater	2.62	171.37
Duct Sealing Installation	-	-
Floor Insulation	1.64	126.72
Gas Central Replacement	2.13	142.11
Refrigerator Replacement	-	-
Residential Lighting	-	(0.10)
Smart Thermostat	-	12.00
Storm Windows	-	4.40
Wall Insulation	-	-
Water Heater Insulation	0.01	3.38
Water Heater Pipe Insulation	0.03	4.13
Window AC	-	-
Window Replacement	8.11	177.66
Total	40.43	1,878.61

2.3 Gross Savings Calculation Methodology

For measures implemented through the 2014 program, savings verification was performed according to methodologies described in TRM V4.0. Table 2-12 identifies the sections in the TRM that were used for verification of measure-level savings under the AWP.

In 2014, there were two measure types implemented under the AWP that are not addressed within the set of TRM savings algorithms; smart thermostats and storm windows. The *ex ante* savings for these measures resulted from NEAT/MHEA stipulated calculations. As these measures accounted for a minor portion of total program savings, the Evaluators deferred to the NEAT/MHEA results during savings verification.

Table 2-12 TRM Sections by Measure Type

Measure	*TRM Version*	*Section in TRM*
Air Infiltration	4.0	2.2.9
Ceiling Insulation	4.0	2.2.2
Central AC Replacement	4.0	2.1.6
ENERGY STAR® Windows	4.0	2.2.7
Floor Insulation	4.0	2.2.4
Gas Furnace Replacement	4.0	2.1.3
Lighting Efficiency	4.0	2.5.1
ENERGY STAR® Refrigerator	4.0	2.4.3
Smart Thermostat	N/A	N/A
Storm Windows	N/A	N/A
Direct Vent Heaters	4.0	2.1.1
Wall Insulation	4.0	2.2.3
Water Heater Jackets	4.0	2.3.2
Water Heater Pipe Insulation	4.0	2.3.3
Window AC	4.0	2.1.10

Air infiltration reduction and ceiling insulation accounted for the majority of both gas and electric savings for the AWP in 2014. Residential lighting (CFL installation) also accounted for a substantial portion of electric savings. The calculation methodologies for these three measures are detailed in the following sections.

The deemed savings algorithms in TRM 4.0 for air infiltration reduction were developed through simulation modeling in BEopt, a residential building simulation modeling platform that uses the DOE EnergyPlus simulation engine. Multiple equipment configurations were simulated in each of the four Arkansas weather zones in developing savings values denominated in deemed savings per CFM50 of air leakage rate reduction. The following table summarizes the deemed savings values for Weather Zone 7.

Table 2-13 Deemed Savings Values for Air Infiltration Reduction, Zone 7

Equipment Type	*kWh Savings / CFM50 (ESF)*	*kW Savings / CFM50 (DSF)*	*Therm Savings / CFM50 (GSF)*	*Peak Therms / CFM50 (GPSF)*
Electric AC with Gas Heat	0.190	0.00016	0.0707	0.002181
Gas Heat Only (no AC)	0.053	n/a	0.0747	0.002181
Elec. AC with Resistance heat	1.812	0.00016	N/A	N/A
Heat Pump	0.818	0.00016	N/A	N/A

The following example considers a residence in Weather Zone 7 with electric AC and gas heat. If the residence had a leakage rate of 16,100 CFM_{50} before air infiltration reduction and a leakage rate of 7,220 CFM_{50} after, then the residence would have an annual gross savings of 1,687 kWh.

$$Air\ Infiltration\ Savings = 0.190 \frac{kWh\ Savings}{CFM_{50}} \cdot \left(16{,}100\ CFM_{50\ pre} - 7{,}220\ CFM_{50\ post}\right)$$

$$Air\ Infiltration\ Savings = 1{,}687\ kWh$$

TRM 4.0 also specifies Minimum Final Ventilation Rates (MVR) and Maximum Pre-installation Infiltration Rates in order to ensure that air infiltration work is performed in accordance with health and safety guidelines and that infiltration reduction is not attempted on homes with prohibitively severe leakage levels.

The MVR specifies the minimum post-installation air infiltration value that can be applied to the deemed savings calculation. If a home's final CFM50 value is below the MVR, the deemed savings calculation for air infiltration reduction on the home is calculated using the MVR rather than the actual post-installation leakage value.

The MVR for a given home is calculated as follows:

$$Min\ CFM50 = [0.01 \times A_{floor} + 7.5 \times (BR + 1)] \times N$$

Where:

Min CFM50 = Minimum final ventilation rate (CFM50)

AFloor = Floor area (ft^2)

BR= Number of bedrooms (must be at least 1)

N = N factor (deemed value based on type of wind shielding and number of stories in home)

With regard to Maximum Pre-installation Infiltration Rate, TRM 4.0 specifies that in order to avoid incentivizing homes with severe building envelope issues that cannot be remedied with typical air infiltration procedures, the baseline pre-installation infiltration rate should be based on a maximum air change rate of 3.0. With this baseline in effect, the maximum allowable pre-installation CFM50 value is calculated as follows:

$$CFM_{50,pre}/ft^2 = \frac{ACH_{Nat,pre} \times h \times N}{60}$$

Where:

CFM50,pre /ft^2 = Per square foot pre-installation infiltration rate (CFM50/ft^2)

ACHNat,pre = Maximum pre-installation air change rate (ACHNat) = 3.0

60 = Constant to convert from minutes to hours

h = Ceiling height (ft) = 8.5 (default)

N = N factor (deemed value based on type of wind shielding and number of stories in home)

If a home's pre-installation infiltration rate exceeds the rate calculated above, the Maximum Pre-installation Infiltration Rate is used for deemed savings calculations.

Additionally, TRM 4.0 specifies a maximum CFM50 per-square-foot value. For deemed savings calculations, pre-installation leakage rates cannot exceed these values.

2.3.1 Ceiling Insulation Savings Calculations

The deemed savings algorithms in TRM 4.0 for ceiling insulation were developed through simulation modeling in BEopt, a residential building simulation modeling platform that uses the DOE EnergyPlus simulation engine. Multiple equipment configurations were simulated in each of the four Arkansas weather zones in developing savings values denominated in deemed savings per square footage of ceiling area. Table 2-14 summarizes the deemed savings values for Weather Zone 8.

Table 2-14 Deemed Savings Values for Ceiling Insulation, Zone 8

Ceiling Insulation Base R-value	*AC/Gas Heat kWh (/ sq. ft.)*	*Gas Heat (no AC) kWh (/ sq. ft.)*	*Gas Heat (no AC) Therms (/ sq. ft.)*	*AC/Electric Resistance kWh (/ sq. ft.)*	*Heat Pump kWh (/ sq. ft.)*	*AC Peak Savings (kW) (/ sq. ft.)*	*Peak Gas Savings[16] (therms) (/ sq. ft.)*
0 to 1	1.8642	0.2203	0.3060	8.734	4.572	0.001393	0.00539
2 to 4	1.0497	0.1215	0.1687	4.846	2.495	0.000765	0.00284
5 to 8	0.6330	0.0728	0.1011	2.909	1.495	0.000461	0.00165
9 to 14	0.3909	0.0446	0.0618	1.784	0.917	0.000293	0.00099
15 to 22	0.1847	0.0216	0.0299	0.858	0.439	0.000131	0.00048

The following example considers a residence in Weather Zone 8 with a heat pump, and a pre-retrofit R-value of ceiling insulation in the range of 9 to 14. If the residence has a ceiling area of 1,200 sq. ft., then the residence would have an annual gross savings of 1,100 kWh.

$$Ceiling\ Insulation\ Savings = 0.917 \frac{kWh}{ft^2} \cdot (1{,}200\ ft^2) = 1{,}100\ kWh$$

[16] Data in table are for Blytheville peak. Other Zone 8 peaks can be calculated by multiplying Blytheville peak by the appropriate factor, m. For Jonesboro, m=0.890 (0-1), m = 0.901 (2 to 4), 0.906 (5 to 8), 0.907 (9 to 14), 0.918 (15 to 22). For Fort Smith, m=0.859 (0-1), m = 0.872 (2 to 4), 0.878 (5 to 8), 0.879 (9 to 14), 0.891 (15 to 22).

TRM 4.0 specifies an efficiency standard of R-38, meaning that in order to qualify for deemed savings the combined R-value of existing and added insulation should be at least R-38.

2.3.2 Compact Fluorescent Lamps (CFLs) Savings Calculations

The deemed savings for compact fluorescent lamps can be calculated by using the following equation.

$$kWh_{savings} = ((Watts_{base} - Watts_{post})/1{,}000)\ x\ Hours\ x\ ISR\ x\ IEF_E$$

The inputs, which assume the following prerequisite knowledge, can be found in Section 2.5.1 of TRM V4.0:

- The quantity and wattages of both pre and post fixtures;
- Whether or not the retrofits were time of sale or direct install (this defines the in-service rate); and
- The heating type of the residence.

For example, if in March 2014 (5) 13W CFLs were directly installed to replace (5) 60W incandescent lamps in a residence with gas heating, the residence would have an annual gross savings of 198 kWh.

$$kWh_{savings} = ((5 \cdot 60 - 5 \cdot 13)/1{,}000 \cdot 792.6 \cdot 0.97 \cdot 1.10 = 198\ kWh$$

TRM 4.0 includes specifications for heating penalties from CFLs in natural gas heated homes, calculated as follows:

$$Therms_{penalty} = \left((W_{base} - W_{post})/1000\right)\ x\ ISR\ x\ IEF_G$$

Where:

IEFg = Interactive Effects Factor to account for gas heating penalties (specified in TRM 4.0 as -0.0063)

TRM 4.0 also accounts for future changes in lighting baselines as per EISA 2007 guidelines. Specifically, TRM 4.0 specifies that the 1st Tier EISA 2007 baseline for CFLs in the 750-1,049 lumen range comes into effect in January 2014, and that the 2nd Tier EISA 2007 baseline for these CFLs comes into effect in January 2020. These baseline changes affect lifetime savings calculations for CFLs.

As per Protocol E2 of TRM 4.0, the enforcement date for a code or standard update is the end of the current program year if the effective date of the code or standard update is before July 1. Thus, the Evaluators calculated 2014 first-year savings using the Pre-EISA 2007 baseline for CFLs in the 750-1,049 lumen range. Deemed savings for these CFLs will be calculated using the 1st Tier EISA baseline beginning in the 2015 program year.

2.4 Net Savings Determination

As with prior program years, the Evaluators applied a net-to-gross ratio of 1 for savings achieved through the program in 2014. The context for and explanation of this determination, which appeared in the 2013 AWP evaluation report, is provided below.

The Evaluators conducted a net-to-gross assessment of the program in 2012 in order to determine the likelihood of significant free-ridership or savings spillover. Feedback obtained from customers, community action agencies, and utility staff indicates that the likelihood for program free-ridership is very low. As a high percentage of AWP participants qualified for and participated in the income-qualified statewide Weatherization Assistance Program (WAP), they are unlikely to be candidates for free-ridership in the AWP.

The promotional structure of the AWP targets customer groups who would be very unlikely to pursue these weatherization projects in the absence of the program, and who would likely not seek out an energy audit at their own cost. Additionally, participants who were visited by the Evaluators' field staff were asked a series of questions related to program savings spillover, and none of these customers identified any potential spillover savings.

Due to these factors, the Evaluators determined the net-to-gross ratio for the Arkansas Weatherization Program to be 1, or 100% of gross savings, for the 2012 program year. This determination has been carried over and applied to the 2014 program year, and 2014 AWP gross savings are equal to net savings.

This determination may be modified, with an additional net-to-gross assessment required, if the portion of participants who provide their own private co-pay (non-WAP) increases significantly. There was no increase in private co-pay activity for the 2014 program year.

2.5 On-site Verification Procedure

In addition to TRM verification, the Evaluators conducted on-site field verification of a sample of participant homes. This process involved reviewing tracking information and inspecting the completeness and accuracy of the implemented measures. This section provides a summary of the methodology used by the Evaluators to conduct the verification activity.

2.5.1 Verification Sampling Methodology

The Evaluators conducted a random sample of participants for the ex-post verification process. The sample size for verification surveys was calculated to meet 90% confidence and 10% precision (90/10) for the overall 2014 program population at the time of the on-site verification activity. The main purpose of the verification activity was to determine whether measures were properly installed in the quantities reported in program tracking data. Thus, the coefficient of variation (CV) used for sampling was not based on

participant savings but was assumed to be .5, which is a commonly assumed CV value for residential program evaluations. The resulting sample size is estimated as:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

With 10% required precision (RP), this calls for a sample of 68 for programs with a sufficiently large population. However, for programs with lower levels of participation, a finite population correction is used to maintain cost-effective verification while meeting precision goals. For the AWP, the Evaluators applied a finite population correction factor as follows:

$$n = \frac{n_0}{1 + {}^{n_0}/_N}$$

Where

n_0 = Sample Required for Large Population

N = Size of Population

n = Corrected Sample

During 2014, 159 residences received measures through the AWP.[17] After applying the population correction factor, the program calls for a sample size of 48 participants.

In total, the Evaluators scheduled appointments with 50 participants. Due to cancellations and customer absences, Evaluator field staff members were able to conduct on-site visits for 38 program participants. This was supplemented by telephone verification with an additional 10 participants for a total of 48 verifications.

In order to design a sample of homes that was representative of the participant population, the Evaluators attempted to conduct on-site appointments and telephone verifications in a manner that matched the distribution of participants across the participating utilities.

Table 2-15 presents the target sample size for each utility provider, along with the number of verifications conducted. Customers receiving utility service from more than one IOU (e.g. receiving gas service from CenterPoint and electric service from EAI) were counted

[17] In addition to these homes, nine homes received an initial audit but did not receive any weatherization or other energy efficiency measures through the AWP. As these homes did not receive utility funding or achieve energy savings during 2014, they are not included in the 2014 sampling parameters.

towards the sample target for both IOUs. In cases where a customer cancelled a verification appointment and the Evaluators were not able to schedule an on-site appointment with another home receiving service from the same utility provider, the Evaluators attempted to meet the sample target through telephone verification. The Evaluators attempted to contact customers four times before categorizing that customer as non-responsive. Due to a higher than expected rate of disconnected or incorrect telephone numbers, the Evaluators exhausted the participant population for SGA and AEP-SWEPCO and were not able to meet the sample target for these groups.

Table 2-15 Verifications by Utility Provider

Utility Provider	*Target Sample*	*Achieved Sample*
EAI	32	34
OG&E	1	2
AEP-SWEPCO	3	1
AOG	1	1
SGA	3	0
CenterPoint	32	35
(Electric - Other)	12	12
(Gas - Other or None)	12	13

2.5.2 Verification Procedure

The primary goal of field verification was to ensure that the reported measures were installed and operating correctly in participant homes. Participants were given Walmart gift cards for their time; these were in the amount of $20. During the on-site visits, the Evaluators' field technicians accomplished the following:

- Verified the implementation status of the measures; verified that the measures were installed, that they were installed correctly, and were functioning properly. Photographs were taken of most of the installed measures.
- Data collected at each site focused on obtaining more specific information regarding the characteristics of the home where the measures were implemented.

A field visit form was completed for each visited site in order to document measure quantities, home characteristics, and any needed additional commentary regarding the visit. Specifically, the field form included the following fields:

- Home Characteristics: The field engineer documented the type of home (i.e. single story vs. multi-story), number of bedrooms, number of bathrooms, total conditioned area, and heating type.
- Measure Quantity Verification: The engineer documented reported vs. actual quantities of each measure type (e.g. CFLs, water heater measures) and any applicable notes regarding burnt out bulbs or non-operational equipment.

- Insulation Assessment: The form includes fields for insulation square footage, the R-value or inches of insulation, and the type of insulation (e.g. blown cell).
- Infiltration Assessment: For homes receiving air infiltration measures, the field engineer conducted a blower door test and recorded ex-post leakage for comparison with reported leakage values.
- Supplemental Notes: The field engineer recorded any notable comments provided by the customer regarding the work that was performed, and identified any verification issues that had occurred during the visit (e.g. if the attic was not accessible).

Overall, the results of the verification activity suggest that measures are for the most part installed in the quantities reported in program tracking data, with a few exceptions. Further information detailing the overall results of the field verification visits can be found in the following section.

2.6 Onsite Verification Results

As described in Section 2.5 of this report, the Evaluators conducted onsite verification visits to 38 participant homes, supplemented by 10 telephone verifications for a total of 48 verifications. These site visits and telephone calls were conducted in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to collect information regarding residence characteristics such as square footage and heating type.

The field and telephone verification activity showed that the weatherization measures had for the most part been installed in the quantities reported within program tracking data. This section summarizes the verification findings by measure category.

2.6.1 Contact Information

All residences were located at the addresses provided within the tracking data. However, many of the telephone numbers listed in the tracking data appeared to be disconnected or incorrect. In total, 26 out of the 121 telephone numbers (22%) dialed by the Evaluators were found to be disconnected or incorrect during the site visit scheduling process. It is possible that some customers disconnected their telephones or changed their telephone number since providing the number to the weatherization contractor, although in the future it would be useful to obtain a secondary telephone numbers from customers when possible.

2.6.1 Air Infiltration

The Evaluators conducted blower door testing in 38 participant homes for the 2014 program year. Of these 38 homes, the CFM_{50} value measured during the verification visit was within 10% of the reported value for 18 (47%) homes. The following figure displays

the percentage difference between the CFM_{50} value reported in EnerTrek and the CFM_{50} value obtained during the Evaluators' site visit. As shown in the figure, the Evaluated CFM_{50} value was more than 10% greater than the Reported CFM50 value for 17 homes. Overall, the Evaluated CFM_{50} value was greater than the Reported CFM_{50} value for 25 of the 38 homes (66%).

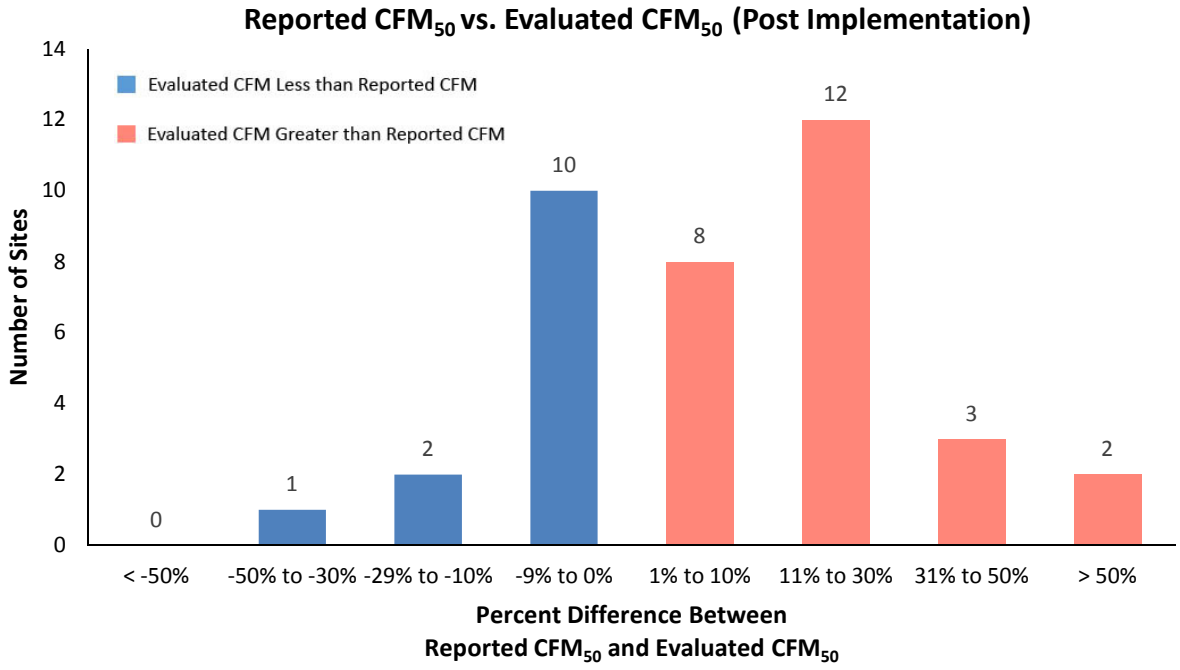


Figure 2-1 Reported CFM_{50} vs. Evaluated CFM_{50}, Post-implementation

A comparison between the blower door testing results from the 2012 program year and the 2014 program year shows that the discrepancies between Evaluated and Reported CFM_{50} values are greater in 2014 than in 2012, both in frequency and magnitude. In 2012, the Evaluated CFM_{50} value was more than 10% greater than the Reported CFM_{50} value for only 13% of sampled homes, compared to 45% of sampled homes in 2014.[18]

There are several factors that may cause the Evaluated CFM_{50} value to be greater than the Reported CFM_{50} value, including customer actions following the weatherization work (such as removing door sweeps), methodological differences between contractor blower door testing and Evaluator blower door testing, and environmental or weather effects. Without additional information regarding air sealing and leakage testing procedures conducted by contractors for each home, it is not possible to determine the reason for these measurement discrepancies. In order to more accurately assess this issue in future years, the Evaluators make the following recommendations:

[18] In 2012, the Evaluators conducted blower door testing in 45 participant homes.

- Include itemized air infiltration measures in tracking data: Thus far, the tracking data for air infiltration measures have included the pre-implementation CFM value and post-implementation CFM value, but have not included information regarding what air sealing measures were installed (e.g. door sweeps, window sealing) in each home, or where they were installed (e.g. back door, bathroom window). Including this information in the program tracking data would allow the Evaluators to determine whether a discrepancy between reported and evaluated leakage could be due to measures becoming damaged, or customers removing measures. Additionally, itemized air sealing measures would allow for a greater level of detail in verification visits.
- Include any air infiltration field notes for each home: Due to situational residence characteristics such as whether a fireplace flue is open or closed, or whether the homeowner did not allow the contractor to close a certain window, it is sometimes difficult to recreate the testing conditions that were present for the contractor measurement. Including information regarding any notable characteristics of the testing conditions that should be recreated during the verification process will minimize the potential for situational discrepancies.

Additionally, the Evaluators offer to have a discussion with CADC and the other agencies and their contractors regarding the methodology used during blower door testing in order to ensure that testing is conducted consistently among agencies, and between the agencies and the Evaluators. Although it is very difficult to consistently reproduce blower door test leakage values on separate occasions, increasing the level of tracking data detail and minimizing methodological differences will help to distinguish data entry and implementation errors from situational and procedural differences.

2.6.1 Window Replacement

All reported instances of storm window installation were verified.

For other window replacement reported, the Evaluators were able to locate and verify all instances of reported window replacement with the exception of one home. For this home, the tracking data indicated that one window had been replaced, but during the verification visit the homeowner stated that the contractors had not replaced any windows. As contractors typically replace multiple windows in a home when conducting window replacement, it is likely that this reported instance was a data entry or database error.
For the window replacements that were successfully verified, the Evaluators found the SHGC, U-Factor, and window area listed in the tracking data to be accurate.

2.6.1 CFLs

All reported instances of 13W CFL installation were verified. For 18W CFLs, the Evaluators verified 375 of the 441 CFLs (85%) represented by sampled participants. In most cases, the difference between reported and evaluated CFL counts was fairly minor and was likely due to customer removal of bulbs. However in one case, the tracking data

reported that 76 CFLs had been installed in a single home, and the Evaluators were able to identify only 14 CFLs. The number of reported CFLs for this home exceeds the typical number of bulb sockets in a single-family residence, and is likely a data collection or EnerTrek error.[19] All verified CFLs matched the wattage and lumen range reported in the EnerTrek tracking data.

2.6.1 Attic Insulation

All reported instances of attic insulation were verified. There were no significant differences between reported pre-installation R values and evaluated pre-installation R values. All homes met the TRM requirement of an R-38 post-installation value. There were no significant differences between reported square footage and evaluated square footage.

2.6.2 Water Heater Jacket and Pipe Wrap

The Evaluators were able to verify all but one instance of reported water heater pipe wrap; one customer had removed their water heater pipe wrap. The reported instance of water heater jacket installation was successfully verified.

2.6.3 Gas Heat Replacement

All reported instances of gas heat replacement were verified.

2.6.4 Smart Thermostat

The reported instance of smart thermostat installation was verified.

2.6.5 Refrigerator Replacement

All reported instances of refrigerator replacement were verified.

2.6.6 Direct Vent Heater

All reported instances of direct vent heater installation were verified.

Overall, the results of the verification activity suggest that measures are for the most part installed in the quantities reported in program tracking data, with a few exceptions. These findings are fairly consistent with the results of the 2012 onsite verification activity, although there are some emerging issues (e.g. increased discrepancies in blower door testing results, and issues with customer contact information) that should be addressed moving forward.

2.7 Review of EnerTrek Input Assumptions

Although the EnerTrek system calculated savings for the AWP using protocols in TRM V3.0, some of the measure inputs required by the TRM were not collected by program contractors during the first few months of 2014. In order to calculate savings, Frontier Associates developed input assumptions for individual measure types. The Evaluators

[19] This home was not serviced by a participating electric utility, so the electric savings from these erroneously reported bulbs did not affect the *ex post* savings for any of the AWP electric IOUs.

reviewed these assumptions and attempted to validate or supplement specific assumptions during the verification activity. The assumptions applied to individual measure calculations for some homes in 2014 include:

- ENERGY STAR® Refrigerator Replacement: Assume replace on burnout
- Gas Central Replacement: Assume replace on burnout
- Direct Vent Heaters: Assume replace on burnout, assume fan type
- Residential Lighting: Assume CFLs located in conditioned area; map lumen range based on wattage
- Window Replacement: Assume qualifying U-Factor and SHGC values

During the verification activity, the Evaluators attempted to gather information regarding the replacement type (e.g. replace on burnout vs. early retirement) of direct vent heaters, refrigerators, and gas heating replacements. The Evaluators found that the majority of these units had not been functional at the time of replacement (replace on burnout). Additionally, none of the four residents who reported that their unit had been operational at the time of replacement were able to recall the age of their pre-existing unit, which is a required parameter for calculating early retirement savings in TRM V4.0.

Data collected by the Evaluators during the verification activity indicated that the assumptions for CFLs and window replacements were reasonable and consistent with actual measure characteristics.

Overall, following a review of program tracking data and field verification findings, the Evaluators determined that all of the listed assumptions were reasonable for measures implemented during 2014.

2.8 Ex Post Net Savings by Measure

Ex post savings were calculated through TRM verification of EnerTrek inputs and *ex ante* savings values. Any instances of discrepancies between *ex ante* and *ex post* savings were due to one of two issues:

- Difference in TRM: EnerTrek calculated measure savings in 2014 using TRM 3.0, and the Evaluators conducted savings verification using TRM 4.0. There were differences in input assumptions, measure parameters, and savings equations between the two TRM versions for some measures.

- Calculation Error: Any misinterpretation of TRM protocols, mathematical errors, or data entry errors may cause *ex ante* savings to be higher or lower than *ex post* (verified) savings.

Table 2-16 presents electric and gas realization rates by measure category. These realization rates are presented at the program level, and individual utility realization rates

may vary from those presented in this table. Individual utility realization rates are presented in Section 2.10 and Section 2.11.

Table 2-16 Gas and Electric Realization Rates by Measure Type

Measure	*kWh Realization Rate*	*kW Realization Rate*	*Therms Realization Rate*	*Peak Therms Realization Rate*
Air Infiltration	127%	130%	153%	188%
Ceiling Insulation	106%	120%	162%	174%
Central AC Replacement	100%	100%	-	-
Direct Vent Heater	-	-	95%	95%
Duct Sealing Installation	0%	0%	-	-
Floor Insulation	-72%	-	25%	13%
Gas Central Replacement	-	-	100%	100%
Refrigerator Replacement	49%	51%	-	-
Residential Lighting	101%	103%	28%	-
Smart Thermostat	100%	-	100%	-
Storm Windows	100%	100%	100%	100%
Wall Insulation	63%	200%	76%	81%
Water Heater Insulation	100%	100%	100%	100%
Water Heater Pipe Insulation	96%	97%	94%	94%
Window AC	100%	100%	-	-
Window Replacement	102%	124%	98%	78%
Overall	110%	122%	142%	166%

The realization rate for most measures was very close to 100%, and the Evaluators found that the majority of discrepancies between *ex ante* and *ex post* savings were due to differences between TRM V3.0 and TRM V4.0 rather than due to calculation errors.

The following list identifies measure categories where there were significant differences between *ex ante* and *ex post* savings, and specifies whether this was due to differences in TRM versions or due to calculation errors:

- Ceiling Insulation
    - Difference in TRM: High overall electric and gas realization rates were due to differences in TRM versions. TRM V4.0 is more granular than TRM V3.0 with regard to the pre-implementation R-value. One effect of this is higher savings for homes that did not have ceiling insulation initially.
- Floor Insulation
    - Difference in TRM: Low overall electric and gas realization rates were due to differences between TRM versions. TRM V3.0 specifies positive kWh

savings for floor insulation, while TRM V4.0 implements an electric savings penalty for homes with gas heat and air conditioning. The simulation procedures used for this measure in TRM V4.0 identified negative electric savings, likely caused by the floor insulation acting as a barrier to ground cooling effects. This would cause the home temperature to be higher during cooling months, likely resulting in increased air conditioner usage.

- Wall Insulation
    - Difference in TRM: Low overall electric and gas realization rates were due to differences between TRM versions. TRM 4.0 specifies lower deemed savings per square foot.
- Residential Lighting
    - Difference in TRM/Calculation Error: Low overall electric and gas realization rates were due to differences between TRM versions and possible EnerTrek calculation issues. CFL annual kWh savings in EnerTrek may have been calculated as an increment of lifetime savings, which takes into account future baseline changes that should not affect first-year kWh savings.
- Air Infiltration
    - Difference in TRM/Calculation Error: High overall electric and gas realization rates are partially due to differences between TRM versions and likely due to calculation errors within *ex ante* savings. TRM V4.0 specifies minimum and maximum caps for CFM_{50} values and specifies different deemed savings values for each weather zone, but the Evaluators were unable to duplicate the EnerTrek *ex ante* savings values using TRM V3.0. The analysis resulted in a wide range of realization rates, both high and low, across the participant population.
- Refrigerator Replacement
    - Calculation Error: A low electric realization rate was primarily due to two instances of substantial *ex ante* overestimation of savings, where one refrigerator was listed with *ex ante* savings of approximately 1,000 kWh, and another with *ex ante* savings of approximately 700 kWh.

Overall, there were fewer instances of calculation errors and incomplete data than were identified in prior program years. Past issues such as calculating savings using an incorrect heating and cooling type appear to have been for the most part resolved, and EnerTrek negated savings for measures that did not qualify for savings as per TRM V3.0 standards. The remaining and emerging issues are fairly minor, with the exception of air infiltration savings.

2.9 Overall Ex Post Net Savings

Table 2-17 presents the savings results of the evaluation of the 2014 Arkansas Weatherization Program, by measure. Total savings summarizes the savings calculations performed as per TRM V4.0 protocols for the AWP. As previously noted, the net-to-gross ratio for the 2014 program year is 1.

Table 2-17 Ex Post Net Savings by Measure Type – Overall

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*
Air Infiltration	56.32	126,484.93	1,391,334.18	620.40	20,546.88	226,015.67
Ceiling Insulation	56.50	97,901.52	1,958,030.48	182.26	10,530.49	210,609.71
Central AC Replacement	3.64	8,850.00	168,150.00	-	-	-
Direct Vent Heater	-	-	-	9.04	588.49	11,769.78
Duct Sealing Installation	-	-	-	-	-	-
Floor Insulation	(0.07)	(441.83)	(8,836.56)	0.97	144.35	2,886.92
Gas Central Replacement	-	-	-	25.00	1,632.58	32,651.59
Refrigerator Replacement	0.22	1,536.52	26,120.82	-	-	-
Residential Lighting	10.77	66,213.86	506,768.48	-	(0.40)	(3.02)
Smart Thermostat	-	105.00	1,260.00	-	358.00	4,296.00
Storm Windows	0.02	29.70	594.00	3.83	100.50	2,010.00
Wall Insulation	0.81	1,145.75	22,915.00	6.08	332.30	6,645.94
Water Heater Insulation	0.01	68.00	884.00	0.04	22.02	286.26
Water Heater Pipe Insulation	0.32	1,096.19	12,058.08	0.71	98.36	1,278.74
Window AC	1.05	643.90	6,760.96	-	-	-
Window Replacement	23.05	27,169.81	543,396.12	35.23	1,012.94	20,258.74
Total	152.63	330,803.34	4,629,435.56	883.56	35,366.50	518,706.31

2.10 Ex Post Net Savings for Electric Utilities

The participating IOUs with homes achieving savings through the 2014 program were AEP-SWEPCO, EAI, and OG&E. Table 2-18 presents the *ex post* net savings results of the evaluation of the 2014 AWP for electric utilities.

Table 2-18 Ex Post Net Savings by Electric Utility

Electric Utility	*# of Homes*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AEP-SWEPCO	12	8.40	31,154.13	461,148.41
EAI	112	105.99	229,868.21	3,271,557.30
OG&E	3	0.63	3,140.96	36,642.36
Non-IOU	41	37.60	66,640.04	860,087.50
Total	168	152.63	330,803.34	4,629,435.56

Table 2-19 through Table 2-21 summarize the *ex post* net savings and net realization rates by measure for each electric utility.

Table 2-19 Ex Post Net Savings by Measure Type – AEP – SWEPCO

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*kWh Realization Rate*	*kW Realization Rate*
Air Infiltration	2.21	11,747.98	129,227.77	169%	146%
Ceiling Insulation	3.14	11,587.14	231,742.72	147%	117%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	-	-	-	-	-
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	(0.04)	(169.30)	(3,386.04)	-63%	-
Gas Central Replacement	-	-	-	-	-
Refrigerator Replacement	0.01	95.55	1,624.37	14%	15%
Residential Lighting	0.73	4,472.41	35,378.81	110%	94%
Smart Thermostat	-	-	-	-	-
Storm Windows	0.01	15.70	314.00	100%	100%
Wall Insulation	0.33	405.27	8,105.40	56%	155%
Water Heater Insulation	-	-	-	-	-
Water Heater Pipe Insulation	0.02	84.59	930.46	96%	97%
Window AC	0.21	114.20	1,199.12	100%	1100%
Window Replacement	1.78	2,800.59	56,011.80	100%	121%
Total	8.40	31,154.13	461,148.41	132%	120%

Table 2-20 Ex Post Net Savings by Measure Type – EAI

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*kWh Realization Rate*	*kW Realization Rate*
Air Infiltration	37.15	91,001.42	1,001,015.64	122%	129%
Ceiling Insulation	42.77	71,702.58	1,434,051.57	104%	121%
Central AC Replacement	2.26	5,701.00	108,319.00	100%	100%
Direct Vent Heater	-	-	-	-	-
Duct Sealing Installation	-	-	-	0%	0%
Floor Insulation	(0.02)	(125.93)	(2,518.56)	-79%	-
Gas Central Replacement	-	-	-	-	-
Refrigerator Replacement	0.18	1,249.13	21,235.15	55%	58%
Residential Lighting	6.48	39,860.61	314,339.71	104%	104%
Smart Thermostat	-	79.00	948.00	100%	-
Storm Windows	0.00	7.80	156.00	100%	100%
Wall Insulation	-	-	-	-	-
Water Heater Insulation	0.01	68.00	884.00	100%	100%
Water Heater Pipe Insulation	0.27	925.89	10,184.83	96%	97%
Window AC	0.84	529.70	5,561.84	100%	100%
Window Replacement	16.04	18,869.01	377,380.11	102%	124%
Total	105.99	229,868.21	3,271,557.30	109%	122%

Table 2-21 Ex Post Net Savings by Measure Type – OG&E

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*kWh Realization Rate*	*kW Realization Rate*
Air Infiltration	0.18	1,981.50	21,796.47	72%	74%
Ceiling Insulation	0.34	454.23	9,084.52	87%	101%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	-	-	-	-	-
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	-	-	-	-	-
Gas Central Replacement	-	-	-	-	-
Refrigerator Replacement	-	-	-	-	-
Residential Lighting	0.11	705.24	5,761.37	110%	92%
Smart Thermostat	-	-	-	-	-
Storm Windows	-	-	-	-	-
Wall Insulation	-	-	-	-	-
Water Heater Insulation	-	-	-	-	-
Water Heater Pipe Insulation	-	-	-	-	-
Window AC	-	-	-	-	-
Window Replacement	-	-	-	-	-
Total	0.63	3,140.96	36,642.36	80%	90%

Table 2-22 presents the electric savings that were not associated with any AWP IOU. These savings are attributable to municipal utilities, co-op utilities, or other energy providers. Thus, the savings are not attributed to any specific program sponsoring utility, and are provided for reference only.

Table 2-22 Ex Post Net Savings by Measure Type – Non-IOU (Electric)

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*kWh Realization Rate*	*kW Realization Rate*
Air Infiltration	16.78	21,754.03	239,294.30	140%	133%
Ceiling Insulation	10.26	14,157.58	283,151.67	96%	117%
Central AC Replacement	1.38	3,149.00	59,831.00	100%	100%
Direct Vent Heater	-	-	-	-	-
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	(0.02)	(146.60)	(2,931.96)	-79%	-
Gas Central Replacement	-	-	-	-	-
Refrigerator Replacement	0.03	191.84	3,261.30	98%	103%
Residential Lighting	3.44	21,175.59	151,288.59	95%	103%
Smart Thermostat	-	26.00	312.00	100%	-
Storm Windows	0.00	6.20	124.00	100%	100%
Wall Insulation	0.48	740.48	14,809.60	67%	253%
Water Heater Insulation	-	-	-	-	-
Water Heater Pipe Insulation	0.02	85.71	942.79	96%	97%
Window AC	-	-	-	-	-
Window Replacement	5.23	5,500.21	110,004.21	103%	125%
Total	37.60	66,640.04	860,087.50	106%	123%

2.11 Ex Post Net Savings for Gas Utilities

The participating gas utilities are AOG, CenterPoint, and SourceGas. Table 2-23 presents the savings results of the evaluation of the 2014 AWP for gas utilities and for non-IOU sources. Table 2-24 through Table 2-26 summarize the *ex post* net savings and net realization rate by measure for each gas utility.

Table 2-23 Ex Post Net Savings by Gas Utility

Gas Utility	*# of Homes*	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*
AOG	3	8.33	479.54	9,590.78
CenterPoint	113	742.24	28,948.28	416,134.08
SGA	11	56.80	2,452.89	34,668.20
Non-IOU	41	76.19	3,485.79	58,313.25
Total	168	883.56	35,366.50	518,706.31

Table 2-24 Ex Post Net Savings by Measure Type – AOG

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*	*Therms Realization Rate*	*Peak Therms Realization Rate*
Air Infiltration	-	-	-	-	-
Ceiling Insulation	3.30	201.12	4,022.47	111%	115%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	-	-	-	-	-
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	-	-	-	-	-
Gas Central Replacement	1.63	108.51	2,170.16	100%	100%
Refrigerator Replacement	-	-	-	-	-
Residential Lighting	-	(0.01)	(0.05)	28%	-
Smart Thermostat	-	-	-	-	-
Storm Windows	-	-	-	-	-
Wall Insulation	2.62	147.18	2,943.54	70%	82%
Water Heater Insulation	-	-	-	-	-
Water Heater Pipe Insulation	-	-	-	-	-
Window AC	-	-	-	-	-
Window Replacement	0.79	22.73	454.66	94%	78%
Total	8.33	479.54	9,590.78	92%	122%

Table 2-25 Ex Post Net Savings by Measure Type – CenterPoint

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*	*Therms Realization Rate*	*Peak Therms Realization Rate*
Air Infiltration	540.33	17,744.73	195,192.02	151%	187%
Ceiling Insulation	145.10	8,302.14	166,042.85	154%	167%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	6.61	430.17	8,603.34	99%	99%
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	-	-	-	-	-
Gas Central Replacement	16.02	1,033.81	20,676.16	100%	100%
Refrigerator Replacement	-	-	-	-	-
Residential Lighting	-	(0.33)	(2.54)	28%	-
Smart Thermostat	-	305.00	3,660.00	100%	-
Storm Windows	3.25	79.00	1,580.00	100%	100%
Wall Insulation	3.46	185.12	3,702.40	81%	81%
Water Heater Insulation	0.02	11.30	146.90	100%	100%
Water Heater Pipe Insulation	0.63	87.70	1,140.12	94%	94%
Window AC	-	-	-	-	-
Window Replacement	26.81	769.64	15,392.81	95%	77%
Total	742.24	28,948.28	416,134.08	144%	122%

Table 2-26 Ex Post Net Savings by Measure Type – SourceGas

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*	*Therms Realization Rate*	*Peak Therms Realization Rate*
Air Infiltration	44.23	1,551.45	17,065.98	145%	175%
Ceiling Insulation	4.92	333.11	6,662.28	97%	103%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	0.21	13.08	261.59	96%	96%
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	0.72	110.29	2,205.80	25%	13%
Gas Central Replacement	5.22	348.16	6,963.16	100%	100%
Refrigerator Replacement	-	-	-	-	-
Residential Lighting	-	(0.03)	(0.19)	27%	-
Smart Thermostat	-	41.00	492.00	100%	-
Storm Windows	0.59	17.10	342.00	100%	100%
Wall Insulation	-	-	-	-	-
Water Heater Insulation	0.01	7.34	95.42	100%	100%
Water Heater Pipe Insulation	0.05	6.79	88.29	94%	95%
Window AC	-	-	-	-	-
Window Replacement	0.84	24.59	491.88	87%	68%
Total	56.80	2,452.89	34,668.20	106%	127%

Table 2-27 presents the *ex post* net gas savings that were not associated with any AWP IOU. As there are few non-IOU gas utility providers in the state of Arkansas, the "non-IOU" *ex ante* gas savings may represent propane customers or possibly tracking database errors that claim gas savings for homes that are not serviced by a gas utility.

Table 2-27 Ex Post Net Savings by Measure Type – Non-IOU (Gas)

Measure	*Peak Demand Savings (Therms)*	*Annual Savings (Therms)*	*Lifetime Savings (Therms)*	*Therms Realization Rate*	*Peak Therms Realization Rate*
Air Infiltration	35.83	1,250.70	13,757.67	198%	228%
Ceiling Insulation	28.94	1,694.11	33,882.11	281%	285%
Central AC Replacement	-	-	-	-	-
Direct Vent Heater	2.22	145.24	2,904.84	85%	85%
Duct Sealing Installation	-	-	-	-	-
Floor Insulation	0.25	34.06	681.12	27%	15%
Gas Central Replacement	2.13	142.11	2,842.11	100%	100%
Refrigerator Replacement	-	-	-	-	-
Residential Lighting	-	(0.03)	(0.24)	33%	-
Smart Thermostat	-	12.00	144.00	100%	-
Storm Windows	-	4.40	88.00	100%	-
Wall Insulation	-	-	-	-	-
Water Heater Insulation	0.01	3.38	43.94	100%	100%
Water Heater Pipe Insulation	0.03	3.87	50.33	94%	95%
Window AC	-	-	-	-	-
Window Replacement	6.79	195.97	3,919.38	110%	84%
Total	76.19	3,485.79	58,313.25	186%	118%

3. Process Evaluation Findings

This chapter presents the key findings from the limited process evaluation that the Evaluators conducted in 2014. This includes a status assessment of recommendations from prior program evaluations and a summary of updates to program operation and delivery. Additionally, the chapter presents findings from in-depth interviews with program staff, provides a review of customer surveys conducted by the participating community action agencies, and addresses the checklist factors for portfolio comprehensiveness.

3.1 Process Evaluation Considerations

The Evaluators conducted a formal process evaluation of the AWP in 2012. This process evaluation resulted in several recommendations and identified program strengths and weaknesses, as well as existing opportunities. TRM V4.0 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the AWP in the context of these requirements.

Table 3-1 Determining Process Evaluation Timing

Component	*Determination*
New and Innovative Components	No. The overall program design has not been modified since 2012.
No Previous Process Evaluation	No. A formal process evaluation was conducted in 2012.
New Vendor or Contractor	No. The program continued to be funded by the Arkansas IOUs, administered by ACAAA, and implemented by the Arkansas community action agencies and their contractors.

Table 3-2 Determining Process Evaluation Conditions

Component	*Determination*
Are program impacts lower or slower than expected?	Yes. Program activity has decreased since 2012 and 2013, and the program has not met its savings goals for any of the IOUs.
Are the educational or informational goals not meeting program goals?	No. Program awareness is sufficient and participants have reported substantial increases in energy efficiency and home maintenance awareness.
Are the participation rates lower or slower than expected?	Yes. Program activity has decreased since 2012 and 2013, and the program has not met its savings goals for any of the IOUs.
Are the program's operational or management structure slow to get up and running or not meeting program administrative needs?	Yes. The community action agencies have struggled to expend utility funds towards weatherization projects, and there have been substantial delays in data reporting and processing.
Is the program's cost-effectiveness less than expected?	No. The program's cost-effectiveness has been maintained at expected levels.
Do participants report problems with the programs or low rates of satisfaction?	No. Participants in 2012 and 2013 reported very high levels of satisfaction with their participation and with the quality of work performed.
Is the program producing the intended market effects?	Possibly. Overall weatherization activity, including development of additional weatherization programs, has increased since the initiation of the AWP, although attribution to the AWP has not been formally established.

While the timing components indicate that a full process evaluation is not currently necessary, the Evaluators determined that the 2014 evaluation of the AWP calls for a limited process evaluation focusing on specific program areas. These areas are identical to those addressed in the 2013 evaluation and include:

- Program operations and managerial structure;
- Program savings performance; and
- Program participation levels.

In order to address these areas, the Evaluators conducted the following research tasks:

- Tracking database and documentation review;
- Interviews with ACAAA and CADC staff; and
- Utility staff interviews.

Additionally, the Evaluators gained insight into savings performance through the impact evaluation. Results from the TRM verification provided insight into *ex ante* vs. *ex post* savings discrepancies and overall measure savings estimates.

Table 3-3 below summarizes the survey and interview data collection for these process evaluation activities, including data collection type, number of respondents, and additional details.

Table 3-3 Interview and Survey Data Collection Summary

Target	*Component*	*Activity*	*N*	*Details*
Utility Staff	AOG Program Manager and Staff	Interview	3	The program manager and operational staff are responsible for managing reimbursements to local agencies, planning for overall program activity and savings expectations, and communicating with agency and ACAAA staff as necessary throughout the program year.
	OG&E Program Manager and Staff	Interview	3	
	SourceGas Program Manager	Interview	1	
	SWEPCO Program Manager	Interview	1	
	CenterPoint Program Manager	Interview	1	
	EAI Program Manager	Interview	1	
ACAAA Staff	ACAAA Staff	Interview	2	The Energy Policy Coordinator and other ACAAA staff are responsible for coordinating efforts among the local agencies and providing information to the utility program managers.
	CADC Executive Director	Interview	1	CADC serves as the lead community action agency and coordinates program implementation, quality assurance, and data reporting processes.

3.2 Response to Program Recommendations

Table 3-4 summarizes the status of issues and recommendations identified in the 2013 process evaluation and impact evaluation of the Arkansas Weatherization Program. While there have been advances in some areas such as improved communication among utilities and stakeholders, fewer errors in tracking exports, and increased compliance with TRM requirements, several of the issues have persisted through the 2014 program year.

Table 3-4 Status of Recommendations from 2013 Program Year

Issue	***Consequences***	***Recommendation***	***Program Response***	***Status of Issue***
There have been delays in database finalization due to uncertainties in data interpretation and requirements between CADC and Frontier.	Reduces accessibility to database for utilities Delays savings reporting and may cause inaccurate reports	Resolve issues early in 2014 program year, including data interpretation issues, so that multiple data and database revisions are not necessary.	There appear to have been fewer issues between Frontier and CADC in terms of gathering the required data fields. However, updates to the EnerTrek database, combined with continued delays in receiving data from some agencies resulted in several tracking data revisions and delays.	Partially addressed
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	Potential lost data Potential delays in data transfer if additional data are needed	Agencies should maintain electronic records of all collected audit, implementation, and verification data.	Agencies continue to maintain hardcopy records of data that are not required for savings analysis. Some data are not available in electronic format.	Persists
Communication among utilities and agencies is limited.	Causes difficulties in utility-agency coordination	Recommendation 1: Hold introductory meetings between utilities and the remaining six agencies in order to develop familiarity and identify key contact persons, establish communication lines Recommendation 2: Develop an organizational chart displaying roles, responsibilities, and contact persons for each entity (utilities, agencies, ACAAA, etc.)	Communication among utilities and other stakeholders has improved substantially throughout the meetings and discussions surrounding development of the Unified Weatherization Program Utilities report that roles and responsibilities have for the most part been clarified and that a formal organizational chart is not likely necessary at this point.	Addressed
Some data required for TRM 2.0 and 3.0 do not appear to have been collected.	Creates difficulties in savings verification May result in inaccurate *ex ante* savings estimates if insufficient inputs are used	Ensure that the data collection forms and database are compliant with relevant TRM requirements to the extent possible based on budget constraints.	EnerTrek was updated to contain nearly all necessary fields for calculation of savings under TRM V3.0. Although some inputs were not collected for the first few months of the year, Frontier developed reliable and conservative assumptions in order to allow for savings analysis.	Addressed

Issue	*Consequences*	*Recommendation*	*Program Response*	*Status of Issue*
Utilities are not aware of project details until end of year.	Limits utility ability to plan for annual reporting Limits utility awareness of program performance	Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.	The level of detail in monthly and quarterly reports to the utilities from CADC and other agencies has not increased. Measure counts and specific participant information have not been included.	Persists
EnerTrek contains erroneous assumptions for individual measure algorithms (air infiltration, attic insulation, window replacement).	Results in inaccurate *ex ante* savings (in this case savings were highly overestimated) Decreases program realization rates	Frontier should perform thorough quality assurance practices and verify that EnerTrek calculations comply with TRM algorithms.	Calculation errors appear to have decreased for 2014, although there were new errors for a few measures such as refrigerator replacement and air infiltration.	Partially addressed
TRM estimates for Therms savings substantially exceed regression analysis results.	TRM formulas may be inaccurately estimating Therms savings.	Conduct further research into TRM industry standards for weatherization, or perform a more in-depth billing analysis for a larger population, prior to implementing TRM changes for air infiltration or insulation.	No further impact research has been conducted for the AWP, and the billing analysis approach was not used for 2014. Difficulties in isolating the effects of individual measures within regression analysis create challenges for updating individual measure savings algorithms.	Persists

3.3 Program Structure Overview

The overall design, structure, and objectives of the Arkansas Weatherization Program have remained fairly constant throughout 2011-2014. This section provides a summary of current program design characteristics and processes, noting any differences between 2014 and prior program years.

In 2014, the Arkansas Weatherization Program (AWP) provided residential energy audits and energy efficiency measure installations to homes whose residents are customers of one or more of the following investor owned utilities (IOUs):

- American Electric Power – Southwestern Electric Power Company (AEP-SWEPCO);
- Entergy Arkansas, Inc. (EAI);
- Oklahoma Gas and Electric (OG&E);
- Arkansas Oklahoma Gas Corporation (AOG);
- CenterPoint Energy (CenterPoint);
- SourceGas Arkansas (SGA); and
- Empire District Electric Company (EDEC).[20]

The program is offered in conjunction with the Department of Energy (DOE) Weatherization Assistance Program (WAP), which provides federal assistance to fund the customer co-payment in the AWP for income-qualified households. In Arkansas, the WAP is administered by the Arkansas Energy Office (AEO).[21] If the customer meets the eligibility requirements of the WAP, the weatherization project can be funded by both the WAP and the AWP in order to fully cover the project cost and eliminate the cost to the customer.[22] Customers who are not eligible for the WAP are required to provide their own co-pay in order to participate in the AWP and receive the audit and associated measures.

[20] EDEC is a sponsoring IOU of the Arkansas Weatherization Program and has achieved savings through the program in past years, but did not have any projects completed in its service territory during 2014.

[21] The administration of the WAP transitioned to the AEO from the Department of Human Services (DHS) during 2013.

[22] Eligibility for the Weatherization Assistance Program (WAP) is based on income thresholds, which increase with the number of residents in the home. A description of the WAP, along with the associated income requirements, can be found here: http://www.benefits.gov/benefits/benefit-details/1843.

In 2014, 91% of participating AWP customers were eligible to have their projects partially funded through the WAP. This is consistent with prior years, where fewer than 10% of participants provided their own co-payment to participate in the AWP.

Rather than an income requirement, eligibility for the AWP is based on a set of criteria regarding customer residence energy efficiency. In order to qualify, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. There were no modifications to these criteria for the 2014 program year.

Local community action agencies work with customers to enroll in the program and determine AWP and WAP eligibility. In 2014, qualifying AWP projects were completed by one of five such agencies:

- Central Arkansas Development Council (CADC);
- Crowley's Ridge Development Council (CRDC);
- Crawford-Sebastian Community Development Council, Inc. (C-SCDC);
- Pine Bluff Jefferson County Economic Opportunities Commission, Inc. (PBJCEOC); and
- Community Action Program for Central Arkansas (CAPCA).

In order to qualify for the AWP, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. Participants must be a residential customer of at least one utility that is involved in the AWP. The program is available only to residences built prior to 1997. Additionally, participant homes must meet three of the following seven criteria:[23]

- Ceiling insulation less than or equal to R-30;
- Wall insulation equal to R-0;
- Floor insulation equal to R-0;
- Single pane windows with no storm windows attached;
- Non-working heating system or heating system with less than 70% AUE;
- Non- working cooling system or cooling system with SEER of 8 or less; and
- Air infiltration problems identified through a) visual inspection of duct-work, walls, floors, ceilings, doors, and windows; or b) pre-blower door test.

[23] Eligibility requirements are taken from AWP program design filed March 15, 2011 with the Commission. These can be found at: http://www.apscservices.info/pdf/07/07-079-tf_62_1.pdf. The Commission Order approving the design was order # 20 located at: http://www.apscservices.info/pdf/07/07-079-tf_76_1.pdf issued on June 30, 2011.

After the customer is approved and the in-home audit is performed, optimal energy efficiency measures for AWP (and WAP, for eligible customers) are identified through the use of National Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software. The measures implemented in participating homes during 2014 include:

- Ceiling, floor and wall insulation;
- Air infiltration reduction;
- Window replacement and storm window installation;
- Heating and air conditioning replacement;
- Water heater insulation jackets and pipe wrap;
- Refrigerator replacement;
- CFL retrofits; and
- Smart thermostats.[24]

The local agencies conduct onsite audits and install the necessary measures using their internal crews or subcontractors. Audit and installation crews record all relevant measure input data and report it to the Central Arkansas Development Council (CADC), who aggregates the information from each agency. Batches of data are then sent to Frontier Associates, the program database provider that manages the EnerTrek software tool. EnerTrek incorporates the onsite data into TRM savings formulas (and NEAT/MHEA values for measures not included in the TRM) to calculate *ex ante* savings for each measure. The resulting savings are made accessible to program utilities and EM&V contractors, who use EnerTrek database exports to conduct measure implementation and savings verification activities.

Table 3-5 identifies core program stages and includes key activities performed throughout the program process. The activities and stages shown for 2014 are fairly consistent with those of 2013 and prior years, with modifications to include additional details and clarifications regarding program procedures.

[24] A complete list of all eligible program measures can be found in ACAAA Docket no. 07-079-TF, Attachment A (AWP Modified Program Design and Description).

Table 3-5 Key Activities and Program Stages, 2014 Program Year

Program Stage	*Key Activities*
Program Design Planning	• Utilities set budgets and savings goals for the program year. • Frontier Associates and the participating agencies make any necessary modifications to data collection procedures or program delivery based on TRM changes or other program design changes. • Agencies plan their program activity based on expected WAP funding levels and planned AWP funding.
Training and Implementation Planning	• Community action agencies, contractors, and other program operations staff attend program-relevant training sessions (primarily for new contractor staff) • ACAAA, CADC, and local agencies discuss implementation and program updates (primarily to comply with TRM changes).
Program Promotion	• Agencies market the program to local customers who may provide a private co-pay. • Agencies enroll customers from the WAP wait list. • Utilities answer customer inquiries about the AWP or refer customers to their respective agencies.
Program Participation	• Customers apply for the AWP and home eligibility is determined. • WAP eligibility is determined. • Participants receive in-home audits and measures are identified. • Contractors install measures that are either stipulated based on NEAT or MHEA software or are agreed upon with the customer (depending on whether or not WAP funds are used for the co-pay).
Data Processing and Monitoring	• Measure costs and participant tracking data are collected by each agency and reported to CADC. • CADC provides periodic cost and participation updates to the utilities. • Frontier Associates receives implementation data from CADC and calculates *ex ante* savings • Frontier Associates sends savings data in batches to the utilities. • Utilities, ACAAA, Frontier Associates, and agencies have periodic discussions regarding program participation levels and other topics.

3.4 Arkansas Weatherization Program 2014 Participation

In 2014, the Arkansas Weatherization Program conducted energy audits in 168 homes, and installed energy efficiency measures in 159 homes. This is a substantial reduction in participation from each of the prior program years (291 homes serviced in 2013, 641 in 2012, and 810 in 2011).

Table 3-6 displays total participation disaggregated by the community action agency associated with the participant. As with prior years, CADC was the most active agency within the program, completing 76% of projects (CADC completed 41% of AWP projects during the 2013 program year). Although Black River Area Development Corporation (BRAD) was eligible to complete projects under the AWP during 2014, this agency did not report any program activity.

Table 3-6 Total Participation by Community Action Agency

Agency Name	*Percentage of Participating Homes*[25]
Central Arkansas Development Council (CADC)	75%
Crowley's Ridge Development Council (CRDC)	12%
Crawford-Sebastian Community Development (C-SCDC)	6%
Community Action Program for Central Arkansas, Inc. (CAPCA)	4%
Pine Bluff-Jefferson County Economic Opportunities Commission (PBJCEOC)	4%
N	159

The AWP is offered in all investor-owned utility service territories and is funded by participating gas utilities and electric utilities throughout Arkansas. Depending on the location of customers and the fuel sources used in their homes, services for each customer are funded by one gas utility, one electric utility, or both a gas and an electric utility. Table 3-7 cross-tabulates participation by the gas and/or electric utility associated with the participant. "N/A" represents projects performed in homes with only one utility source or with a utility service provider that is not part of the AWP. This table does not include the audit-only homes that did not receive measures through the program.[26]

Table 3-7 Participation by Associated Utility, 2014

Electric Utility	Gas Utility			
	Arkansas Oklahoma Gas	*CenterPoint*	*Source Gas*	*N/A*
EAI	-	69	1	35
OG&E	2	-	-	1
AEP-SWEPCO	1	4	2	4
N/A	-	33	7	-

Figure 3-1 displays a comparison between 2014 and 2013 in terms of participation rates by month. The number of weatherization projects per month in 2014 was lower than 2013 for all months other than April and June. In contrast to 2013, the majority of projects in 2014 were completed during the first half of the program year. This is likely due to the fact that program activity was delayed in 2013 due to organizational changes related to the restructuring of the Weatherization Assistance Program and the eligible weatherization

[25] Not included in the percentages are eight homes for CADC, and one home for C-SCDC that only received an audit without receiving any measures through the program.

[26] The nine audit only homes were distributed across utility providers as follows: SGA/AEP-SWEPCO: 1 home; CenterPoint/None: 1 home; EAI/None: 1 home; CenterPoint/EAI: 6 homes.

service provider agencies. 2014 did not experience this delay, but program participation slowed substantially towards the end of the program year.

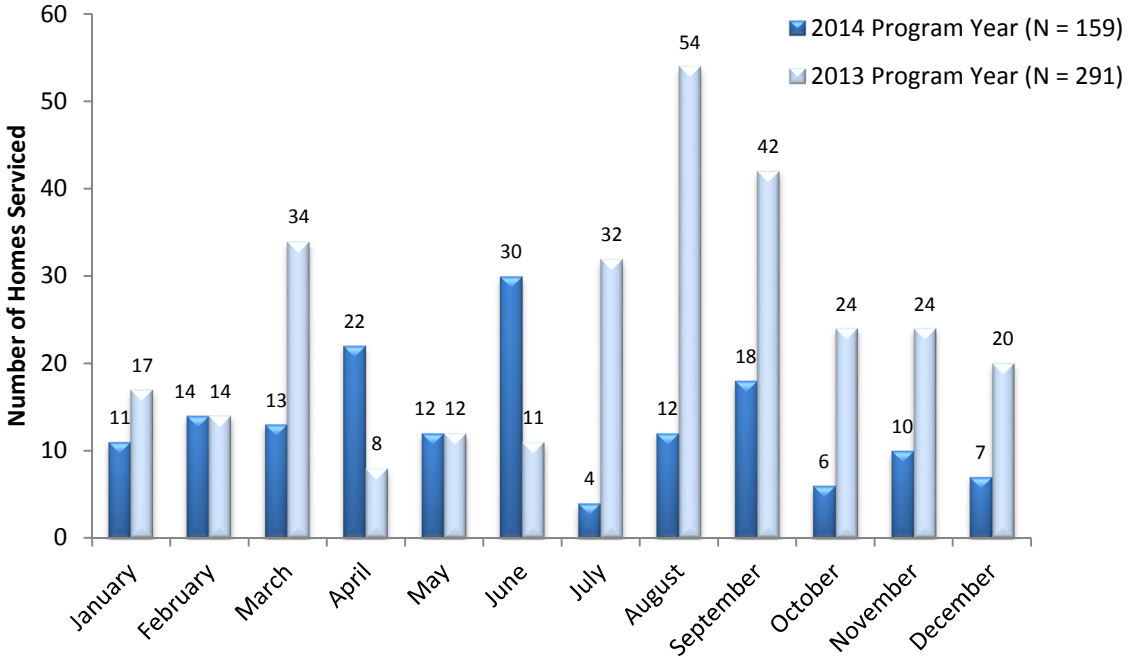


Figure 3-1 Participation Rates by Month, 2014 vs. 2013

The average square footage of participating residences was 1,358 while the median square footage was 1,222. The average number of bedrooms was 2.8, and the average age of participant homes was 47 years. These values are nearly identical to those found for the 2013 and 2012 program years.

3.5 Program Staff Interviews

As part of the evaluation of the 2014 Arkansas Weatherization Program, the Evaluators conducted in-depth interviews with utility staff members involved in managing and operating the program, as well as ACAAA representatives and CADC staff. These interviews primarily served to assess the status of previous evaluation conclusions and recommendations, as well as to identify notable changes in program operation, delivery, and performance. As program performance continued to decrease in 2014, the interviews also addressed possible explanations for persisting program challenges.

This section presents key findings and issues identified through these interviews.

3.5.1 Program Efficiency and Performance

Continued Prioritization of WAP Funding: As with prior years, utility, ACAAA, and CADC staff acknowledged the challenges that have emerged and persisted due to the AWP's relationship with the Weatherization Assistance Program (WAP). The Arkansas

Energy Office (AEO), which administers the WAP, has directed the agencies to follow a specific set of rules in order to comply with WAP procedures. According to CADC and ACAAA, the participating agencies have been directed to prioritize LIHEAP funding over AWP funding when implementing weatherization projects; remaining LIHEAP funds were set to expire on September 30th, 2014. This works as a barrier to participation for the AWP, and was not resolved during 2014.

Persisting Reliance on WAP and AEO Operations: Additionally, program staff noted that the information and guidance from the AEO continually changed throughout the program year with regard to upcoming and existing funding levels and program requirements. As the participating agencies tend to complete weatherization work only when program activity is allowed under the WAP, the AWP is directly affected by any WAP funding delays or work stoppage. Overall, program staff explained that the agencies' ability to complete projects through the WAP has been very unpredictable, which has decreased their overall weatherization activity and constrained AWP participation potential.

Program staff noted that if the WAP had been operating efficiently and the AEO had made efforts to work with the AWP, the program would likely be much closer to its goals. As recruiting private co-pay customers into the AWP has not been very successful thus far, program staff explained that effective coordination between the WAP and AWP is essential for AWP success.

Continued Program Decline: When asked about program performance in 2014 as compared with prior years, utility staff noted that participation rates have steadily decreased during recent years and that very few significant program improvements had been made. Several utility staff members reported that their expectations for AWP performance are very low, and that inherent flaws in the program's design have created strong performance barriers. Utility staff stated that while they are not optimistic about the AWP's future performance, they anticipate that the upcoming Unified Weatherization Program that was developed by the utilities and other stakeholders will be a more effective method of meeting the state's weatherization needs.

Continued Private Co-Payment Issues: When asked about the presence of AWP participants who are not eligible for WAP-funding, the general statement among interviewees was that the AWP has continued to encounter barriers to participation for these customers. As with prior years, staff identified barriers including AWP eligibility requirements, the reliance on WAP funding and participation levels, and the continued customer perspective that the AWP is associated with an income requirement. Overall, utility staff members reiterated their perspectives from prior program years: that they would like to achieve increased participation from private co-payment customers, but that these existing barriers are well-established and difficult to reduce.

3.5.2 Data Quality and Availability

Continued Data Accuracy Issues: With regard to data accuracy, utilities noted that Frontier had made several revisions to individual EnerTrek batches, and that they did not rely on the *ex ante* savings numbers because of likely adjustments within EnerTrek or corrections implemented by the Evaluators. The majority of utility staff reported that there had been no noticeable improvements in data accuracy, and that many of the data issues from prior years appear to have persisted through 2014.

Need for Increased Detail in Agency Reports: Utility staff reported that they have continued to receive periodic program activity updates from CADC. Every quarter, CADC sends a report detailing the number of homes serviced, the amount of program dollars expended to date, and the remaining budget for each utility. Although these reports contain overall cost information, they do not include the measure counts or costs by measure. Utility staff noted that having the measure implementation activity throughout the program year would be helpful for planning purposes.

When asked whether this could be done, CADC noted that it would be possible to provide the utilities with measure-level information (although individual measure savings would not be present until Frontier had processed the data through the EnerTrek system). The Evaluators recommend that the agencies provide measure-level information in the periodic reports to the utilities moving forward.

Continued Hardcopy Documentation: When asked about whether the agencies have begun to record all data electronically, CADC reported that the agencies create electronic reports of the requested data but maintain hardcopy records of all remaining data. In past years where additional measure details were needed late in the program year, this procedure has led to delays in data reporting. However, this was not an issue during the 2014 program year and the agencies were ultimately able to provide all necessary inputs.

Increased Frequency of EnerTrek Reporting: When asked about the quality and frequency of program activity updates from Frontier Associates, several utility staff members noted that Frontier was able to provide full program activity details in batches during 2014. These batches included measure counts, customer information, and *ex ante* savings estimates. Although utility staff noted that they would have preferred more timely or more frequent batches, several staff members acknowledged that the data reporting frequency had improved.

3.5.1 Weatherization Assistance Program Design

Continued WAP Waiting List Issues: During 2013, interview respondents reported that the Arkansas Energy Office may allow for some flexibility within the WAP waiting list for projects that are able to leverage additional funding sources. Program staff explained that customers who are on the WAP waiting list but who also qualify for AWP funds may be

moved to a higher priority on the list. However, program staff noted that the AEO had not made any allowances regarding WAP waiting-list customers who are eligible for the AWP. CADC stated that if the AEO recognizes the benefits of AWP leveraging of WAP funds, both programs would benefit as a result. It is currently unclear whether any such arrangements will be made moving forward, although CADC has made efforts to discuss these issues with AEO staff.

Upcoming WAP Software Tool Update: In terms of changes within the WAP that may have affected the AWP, program staff noted that AEO decided to discontinue the use of the NEAT/MHEA audit tool for the WAP and instead switch to a new software tool. The AWP was initially designed to comply with WAP protocols, and it was estimated that using the same audit tool would be beneficial to agencies that claim both WAP and AWP projects. With the upcoming audit tool change for the WAP, the participating community action agencies have expressed concern about having to use two audit tools.

Program staff noted that if the agencies are required to use different audit tools for the WAP than for the AWP, they may decide to only complete projects through the WAP. This would result in very few, if any, AWP project completions. It is unclear whether this will be an issue during the 2015 program year, as the agencies have not yet been required to adopt the new audit tool and are still allowed to use NEAT/MHEA for WAP projects.

Internal AEO Changes: Program staff explained that there will be several staffing changes in the AEO for 2015, and that this may have an effect on the administration and delivery of the WAP. It is unclear how changes within AEO will ultimately affect the AWP, although increased efficiency and consistency with the WAP would likely benefit the AWP over time. While program staff were not certain about how the WAP will operate in 2015, CADC anticipates that the working relationship between the WAP and AWP may improve moving forward.

Localized Service Provider Interruption: In terms of weatherization service providers, ACAAA and CADC staff explained that the AWP continued to use the same six agencies that were authorized to provide weatherization during the 2013 program year. However, the WAP caused a reconfiguration in the agency service territory and added a seventh, non-agency, service provider in order to provide weatherization in the Pulaski and Lonoke areas. This service provider was ultimately not approved to operate as a weatherization provider due to delays in the state WAP plan, but ACAAA reported that during July through December clients were not receiving service in the affected areas.

At the time of the interview, program staff did not know which agency or organization would be authorized to provide service in the Pulaski and Lonoke areas moving forward. This reconfiguration decreased AWP participation for those counties, and program staff noted that they hope to rectify the lack of participation in these areas in the future if they are allowed to do so.

3.5.2 Communication and Collaborative Efforts

Improved Utility Collaboration through Upcoming Framework Development: Utility staff explained that although coordination of all parties involved in the AWP has been very difficult, the collaboration involved in developing the upcoming Unified Weatherization Program has improved the communication and overall working relationship among the utilities. Several utilities also reported that they are planning to coordinate with other utilities in developing cross-fuel weatherization services under the new framework, and that they expect the new structure to operate more efficiently and effectively.

CADC and EnerTrek Coordination: CADC noted that the cost of updating their audit and implementation data sheets is substantial, and that any updates implemented in the EnerTrek system require the agencies to update these sheets in order to remain compliant with data collection needs. CADC noted that although there were multiple data collection and formatting changes needed during 2014 that potentially caused delays in data reporting, the working relationship with Frontier has been fairly positive.

Transition from ACAAA to CADC Administration: ACAAA explained that moving forward into the 2015 program year, CADC will become the administrator of the AWP and ACAAA will slowly transition away from the program. In anticipation of this change, ACAAA has been training CADC in program operation and annual reporting procedures. Both ACAAA and CADC reported that this process had gone smoothly thus far, and that the two organizations have been able to communicate effectively about the transition.

3.6 Tracking Database Review

As with prior years, Frontier Associates develops and maintains EnerTrek, the software tool that is used to store participant data and to calculate measure level savings based on collected inputs and TRM formulas. EnerTrek includes a full list of all participants, the measures that were installed in their homes, and the kWh and Therms savings associated with each measure.

During the 2014 program year, the Evaluators received periodic tracking data updates as well as final tracking exports.

The EnerTrek system was updated to include necessary inputs as per TRM V3.0 for the 2014 program year. Other than these updates, the structure and content of program tracking data remained consistent with prior years. The Evaluators previously reviewed program tracking data in 2013 in order to assess its compliance with Protocol A of TRM V4.0, which specifies that tracking data should be checked for:

- Participating Customer Information;
- Measure Specific Information;
- Vendor Specific Information;

- Program Tracking Information;
- Program Costs; and
- Marketing & Outreach Activities.

The Evaluators conducted a review of each of the above factors within the 2014 program tracking data with the exception of marketing and outreach activities as these are outside the scope of EnerTrek reporting.

Each of these factors was assessed individually based on the guidelines stated in TRM V4.0. Overall, the Evaluators conclude the following regarding tracking data completeness:

- The tracking data contained names and addresses for all participants, and contained contact information for all but one participant. All participants were listed with a Job ID number. Additional participant information present in the tracking data included gas and electric utility provider designations and utility account numbers.
- All participant records included the name of the agency that implemented the weatherization services, and all records included the date of measure installation with the exception of the nine homes that only received an audit through the program.
- The tracking data included project level costs for each home. The exports received by the Evaluators did not include measure-level costs.
- Premise characteristics such as home heating type, cooling type, construction date, baseline measurements, and attic square footage were present for all participants where necessary.
- The tracking data included sufficient information for the majority of measures as per the requirements of TRM V3.0.

3.6.1 Tracking Data Recommendations

While the content of 2014 tracking data appeared to be for the most part complete, there were a few issues with some measures and fields that should be addressed for future program years. The Evaluators provide the following recommendations for consideration:

- Approximately 10% of homes had a listed gas utility of “None”, but were listed as having gas heating. These homes may receive propane service, but for purposes of comprehensive data collection the Evaluators recommend that contractors distinguish between customers who have no gas in their homes from customers who have propane or receive gas from another source.
- Four homes were listed as having CFLs and other measures installed, but did not have associated *ex ante* savings for some measures. It is unclear why *ex ante*

savings were not calculated for these homes but this issue should be investigated for the 2015 program year.

- The tracking data did not include the age of pre-existing equipment for many of the refrigerator replacements, direct vent heaters, and furnace replacements that were implemented. This information should be collected in the future for all homes where the measure is categorized as an early retirement replacement.
- As recommended in prior years, the Evaluators advise participating agencies to record all collected data, including data that are not initially requested for savings calculation, in an electronic format. This may include the presence of window air conditioner units, in-progress construction work, or whether the home configuration required any atypical methods to be performed during the contractor blower door test. These data may be useful during the verification process and storing data electronically will likely reduce reporting delays if additional inputs are requested by Frontier, the utilities, or the Evaluators.

3.7 Review of Agency Participant Surveys

Although the Evaluators did not conduct a survey of AWP participants during 2014, ACAAA provided the Evaluators with the results of participant surveys that were conducted by community action agency service providers. This section summarizes the results of these surveys in order to provide an update regarding customer satisfaction.

As part of their internal record keeping and program evaluation, ACAAA and the local community action agencies administer surveys to customers who have participated in the AWP. The purpose of these surveys is to gather information regarding customer satisfaction, and general feedback from customers regarding their experience with the agencies and program as a whole.

During 2014, the participating agencies submitted a total of 132 AWP satisfaction surveys to ACAAA.

The satisfaction survey asked customers to rate their satisfaction with individual program elements, on a scale of *very satisfied* to *very dissatisfied*. Key findings for each program element included in the survey are as follows:

- **Information Supplied in the Energy Audit:** None of the respondents reported being dissatisfied with the information supplied, and 92% indicated that they were very satisfied with this element.
- **Material Used for Weatherization Work:** None of the respondents reported being dissatisfied with the material used, and 92% indicated that they were very satisfied with this element.
- **Workmanship of the Delivered Services:** None of the respondents reported being dissatisfied with the workmanship of the delivered services, and 92% indicated that they were very satisfied with this element.

- **Speed of Delivered Services:** One respondent indicated that they were *dissatisfied* with the speed of delivered services. The remaining 131 respondents stated that they were either *satisfied* or *very satisfied* with this program element.
- **Weatherization Program as a Whole:** One respondent indicated that they were *dissatisfied* with the AWP as a whole. The remaining 131 respondents stated that they were either *satisfied* or *very satisfied* with the overall program.

These results suggest that participating customers are highly satisfied with the AWP, and that there are no program delivery issues that are negatively affecting the customer experience. This is consistent with the Evaluators' participant survey from 2012, where nearly all respondents indicated that they highly valued the program and that their experience had been positive.

3.8 Comprehensiveness Factors

The Arkansas Public Service Commission has in place a set of criteria in order to determine whether a DSM portfolio qualifies as "Comprehensive". This section provides updates to the review of the Arkansas Weatherization Program that was conducted by the Evaluators in prior years in relation to each factor.

As the AWP is one component of the larger utility energy efficiency program portfolios, a broader perspective is necessary in order to determine how well it is serving its intended role in those groups of programs. Utility annual reports and portfolio evaluations may present the AWP within the context of these broader energy efficiency portfolios. This section focuses on the comprehensiveness factors as they relate to the AWP on the program-level.

Additionally, as there were few changes to program design and operation during the 2014 program year, this review uses the prior comprehensiveness findings as a baseline and provides updates where appropriate.

- ***Factor 1:*** *Whether the programs and/or portfolio provide, either directly or through identification and coordination, the education,* ***training****, marketing, or outreach needed to address market barriers to the adoption of cost-effective energy efficiency measures;*
    - **Assessment of Education**

      The AWP has continued to implement educational efforts towards its prospective participants and other customers. This includes:
        - Providing educational materials (energy audit, brochures, demonstrations)
        - Providing outreach through multiple channels (news releases, in-person, direct mail, informational flyers, website)

- Providing education targeted to specific market barriers (emphasizing increased comfort and safety levels as a benefit of energy efficiency)

As with prior years, improvement is needed for the following component:

- Providing coordinated education from multiple entities. Each agency and some utilities provide this, but based on interviews with agency and utility staff, the coordination could be improved. For example, seeking best practices from agency to agency may lead to a unified and effective educational approach.

- **Assessment of Training**

The active community action agencies have continued to participate in multiple training courses throughout the year. This includes training related to program updates and data requirements, as well as training that leads to residential audit and installation certifications.[27] These courses maintain contractor skill levels and ensure that agency services comply with up-to-date audit and installation requirements.

- **Marketing and Outreach**

The marketing methods that have been used during 2013 meet the following criteria:

- Performed through several channels (in-person, websites, direct mail, word-of-mouth)

Improvement is needed for the following components:

- Promoted by trade allies (agencies and their contractors). Program marketing activity has generally been negatively correlated with the increase in WAP waiting list participants. Agencies could be more active in promoting the program to non-WAP participants, although these efforts appear to have increased during the 2013 program year. [28]
- Address specific barriers. As five of the six participating community action agencies do not mention the AWP in the weatherization sections of their websites, customers who do not meet the WAP income requirement or are willing to provide their own co-payment may not be aware that the AWP option exists. The framing of weatherization as exclusively an income-qualified service is a barrier to the AWP that should be addressed moving forward.

[27] Further training information may be found in the Arkansas Weatherization Program annual report.
[28] Based on program tracking data, a higher percentage (~10%) of participants were non-WAP customers as compared to prior years where less than 5% of participants were non-WAP customers.

- ***Factor 2:*** *Budgetary, Management, and Program Delivery Resources*

  Although utility budget allocations to the AWP are sufficient to fund the targeted number of homes, the AWP has continually experienced challenges in meeting program goals due to organizational and program delivery issues.

  While there are no budgetary issues on the part of the sponsoring utilities, funding issues within the WAP have constrained the AWP's participation potential and effectively reduced program resources.

  As mentioned in prior evaluations, adequate budgetary and staffing levels may not be achieved unless the agencies have access to reliable and sufficient funding through the WAP.

- ***Factor 3:*** *Addressing Major End-Uses*

  The measure list available to the AWP did not change in 2014. The AWP offers a wide range of measures, which are chosen based on cost-effectiveness testing through NEAT and MHEA. The list of eligible program measures covers all major end-uses for targeted customer homes, including:

  - HVAC systems;
  - Equipment tune-ups;
  - Hot water measures;
  - Appliances (refrigerators);
  - Safety measures (smoke detectors);
  - Lighting; and
  - Building envelope measures.[29]

  The "whole house" approach to participant home improvements is conducive to providing a comprehensive set of measures in each home. The eligible measure list may be modified if additional energy efficiency measures become relevant to the residential sector.

- ***Factor 4:*** *Comprehensively Addressing Customer Needs*

  The AWP is designed to comprehensively address the major needs of its participants by providing the following benefits:

  - Technical assistance through in-home audits;
  - Energy and monthly bill savings through measure installation; and
  - Increased comfort and/or safety for participants.

[29] A complete list of eligible AWP measures can be found in program filing and planning documentation such as Attachment A, (AWP Modified Program Design and Description), of ACAAA Docket no. 07-079-TF.

Although the AWP is able to provide these benefits to customers who participate in the program, there remain a large number of utility customers who are in need of such services but whose participation has been delayed due to the program's operational issues.

Participants who provide their own private co-pay for the audit and energy efficiency measures may choose to receive a less comprehensive set of services as they are allowed to select individual measures. These participants are encouraged to install the full set of recommended items, but comprehensiveness within measure installation is not required by the program in these cases.

- ***Factor 5:*** *Targeting Market Sectors & Leveraging Opportunities*

  The AWP focuses on a specific market of utility residential customers whose homes are severely energy inefficient. The AWP also involves utility partnerships and is intended to provide cross-fuel coordination rather than focusing only on gas or electric savings in isolation. This program is intended to amplify the benefits of the statewide Weatherization Assistance Program (WAP) in order to provide additional services to customers who have substantial weatherization needs. Thus, in theory, the program leverages WAP resources and is delivered through the same channels as the WAP.

- ***Factor 6:*** *Cost-Effectiveness of Energy Efficiency*

  There have been no significant improvements to program cost-effectiveness for 2014. Although the program is designed to cost-effectively generate net savings and meet the stated annual program goals, it has been unable to meet the annual goals thus far. Cost-effectiveness has varied widely among utilities in prior years. The AWP has successfully met industry standards for net-to-gross levels, as the Evaluators have determined that it calls for a net-to-gross ratio of 1. However, in terms of cost-effectiveness and savings goals, the AWP has not performed sufficiently.

- ***Factor 7:*** *Adequacy of EM&V Procedures*

  The AWP was reviewed for EM&V procedures in the following areas:

  - QA/QC and EM&V procedures conducted by utility staff;
  - QA/QC and EM&V procedures conducted by installation contractor staff; and
  - QA/QC and EM&V procedures conducted by the Evaluators.

  The onsite QA/QC procedures currently conducted by utility staff and agency staff are adequate. These procedures monitor implementation quality, ensure the accuracy of *ex ante* records, and are able to resolve onsite issues soon after they occur. During onsite field verification visits during 2012, the Evaluators found that the reported installation data was fairly accurate and matched actual observed

conditions for the majority of measures. The issues that were identified during these site visits are detailed in Section 2.6.

Although the issues regarding data consistency, calculation accuracy, and data cleaning have continued into the 2014 year, the current version of the tracking database within EnerTrek contains nearly all necessary information to comply with TRM V3.0 requirements.[30] Frontier Associates, has made efforts to update the system as needed, and although this has resulted in delays and access issues, the finalized tracking data for 2014 were adequate for calculating program savings. There continue to be some improvements that could be made to the tracking system, as identified within this report. Improvements to reports provided by CADC are needed in order to provide utilities with additional program activity information for planning purposes.

The Arkansas Weatherization Program meets several of the comprehensiveness requirements, but issues related to Factors 1, 2, 6, and 7 have persisted through the 2014 program year. In order to address these issues, changes will likely be necessary both within the program's operational structure and within the external market, before these criteria can be fully met. Some of these changes are likely outside the scope of AWP operations and management, as they are caused by the program's connection to the WAP. As previously noted, utility annual reports and other portfolio-level assessments may provide a more comprehensive view of how the AWP fits into the larger context of the sponsoring utilities' energy efficiency program portfolios.

[30] See Section 2.8 of this report for detailed information regarding the program tracking data review.

4. Conclusions and Recommendations

After reviewing the Arkansas Weatherization Program for 2014, the Evaluators highlight the following conclusions:

Continued WAP Reliance Issues: As with prior years, utility, ACAAA, and CADC staff acknowledged the challenges that have emerged and persisted due to the AWP's relationship with the Weatherization Assistance Program (WAP).

Ideally, this arrangement would use utility funds to efficiently leverage federal funding and substantially increase the number of weatherization projects that the agencies are able to perform. However, the AWP's inherent link to the WAP has continued to result in performance issues due to federal funding reductions and statewide program reorganization. Additionally, the participating agencies were directed to prioritize LIHEAP funding over AWP funding when implementing weatherization projects, which is a key barrier to AWP program activity.

The transfer of the WAP to the AEO does not appear to have mitigated any of the AWP's operational or performance issues. It is possible that a more effective working relationship between the AEO and AWP staff will emerge in the future, but thus far the AWP has not been able to consistently leverage funds through the WAP.

Decreasing Program Activity: The number of participants and the resulting savings levels for the AWP have steadily decreased since the 2011 program year. This decline in program activity is likely due to several issues including variable agency engagement in weatherization services, inconsistent availability of WAP funding, and insufficient interest from private co-pay customers. Although program staff has made efforts to mitigate each of these issues in recent years, the major operational challenges affecting the program have not been sufficiently addressed. When asked about potential future participation, utility staff stated that they do not expect program performance to increase, and ACAAA and CADC staff explained that future program success depends heavily on WAP reliability and organization.

Upcoming Unified Weatherization Program: The new weatherization framework developed by the utilities and other stakeholders will establish statewide weatherization procedures and services, starting at the beginning of the upcoming program cycle.[31] Utility staff reported that they anticipate that this Unified Weatherization Program will be a more effective method of meeting the state's weatherization needs. Additionally, utility staff noted that the collaborative relationship among utilities has improved during the development of the new framework. This is not a direct result of the AWP, but does address the utility communication issue discussed in prior evaluation reports.

[31] As 2015 will be another bridge year for the program, the next program cycle will begin, at the earliest, in January of 2016.

Improved Tracking Data Procedures: Frontier Associates has been fairly responsive to past evaluation recommendations and was able to provide utilities with batches of EnerTrek data throughout the program year. Additionally, Frontier Associates corrected the errors that the Evaluators identified in the 2013 evaluation report. Although the Evaluators identified several additional tracking data issues for the 2014 program year, the magnitude and frequency of these issues appears to have decreased. With regard to TRM compliance, Frontier Associates was able to accurately update the EnerTrek system as per TRM V3.0 protocols. There were some late revisions and corrections within EnerTrek after final data had been provided to the utilities, but these were fairly minor.

Continued Limitations of Program Activity Reports: Utility staff stated that the quarterly program activity reports that they receive from CADC have not yet included measure-level information such as measure costs and counts, or specific customer information. It was previously recommended that these details be included in the periodic reports, and CADC noted that it would be possible to do so, but the utilities continued to express their need for additional details throughout the program year. These details would be useful for planning purposes, and would allow the utilities to roughly estimate their expected savings during the year rather than waiting until the EnerTrek reports are distributed.

Continued TRM Update Issues: While the current version of the tracking database contains adequate calculations and inputs for TRM V3.0, the processes of uploading data to the database and updating database structure have continued to be time-consuming and costly. In addition to administrative costs, the time and budget required to retroactively update the database can create barriers to program performance.

In order to fully comply with any future TRM updates, EnerTrek will have to be flexible enough to receive updates without disrupting the data input process or delaying savings reporting. If the update process becomes too costly or time-consuming, it may be more efficient to only update the inputs for the highest-savings measures and use existing inputs for the remaining measures. This may affect program realization rates, but will not affect program net savings as the Evaluators would calculate savings as per the most current TRM.

Weatherization Messaging Issues: In order to assess current program promotion and informational resources, the Evaluators reviewed each utility and agency website for information regarding the AWP. All of the participating utilities currently have a section on their websites describing the program, or providing a link to the website of their local community action agency. However, after reviewing the specific program information provided, the Evaluators found that several utilities provide or link to documents that list more service providers than are currently eligible for weatherization services. Thus, it appears that these program materials are out-of-date.

Upon reviewing the websites of the six participating community action agencies, the Evaluators found that five out of the six agencies provide information about the WAP but

do not discuss the AWP. These five agencies describe weatherization as an income-qualified service, but do not state that there is no income requirement for the AWP or that customers are allowed to provide their own co-payment under this program. This may discourage many prospective participants who are not eligible for enrollment in the WAP from considering the AWP, and may have a negative effect on the number of potential private co-pay customers that are aware of the program.

Based on these conclusions and other findings, the Evaluators provide the following recommendations:

Actively Work with AEO to Develop Program Coordination: As the AWP is closely tied to the operations and performance of the WAP, it is essential for the WAP to acknowledge the AWP as a viable leveraging opportunity. Additionally, maintaining consistency between the WAP and AWP where possible (e.g. with auditing software) will likely increase agency engagement in the AWP and will reduce data collection and reporting issues moving forward. The Evaluators recommend that CADC continue to discuss the existing program issues with AEO staff, and make efforts to create a mutually beneficial relationship.

Resolve Minor Tracking Data Issues: The Evaluators identified several minor issues within program tracking data for the 2014 year. This includes missing *ex ante* savings for some CFLs, missing ages of pre-existing units, and apparent calculation errors for air infiltration and refrigerator replacement savings. The Evaluators recommend resolving these issues in order to maximize potential program savings and maintain expected measure-level realization rates. These issues are further discussed in Sections 2.8 and 3.6 of this report.

Update Program Documentation on Utility and Agency Websites: The Evaluators found that several utilities provide or link to program documents that are out-of-date. The Evaluators recommend that the utilities provide links to updated program documents or include a note that informs customers of the currently active agencies.

Additionally, the Evaluators found that five out of the six agencies provide information about the WAP but do not discuss the AWP. These five agencies describe weatherization as an income-qualified service, but do not state that there is no income requirement for the AWP or that customers are allowed to provide their own co-payment under this program. The Evaluators recommend that each of the participating community action agencies update their websites to include information regarding the AWP, including information clarifying that the AWP does not have an income requirement.

Maintain Electronic Records: As mentioned in the prior report, it would be beneficial for each agency to collect and maintain accessible electronic records of any data that may be requested by Frontier. Alternatively, CADC would aggregate the data from each agency and store it in a centrally accessible way. Situations where there are implementation, audit, or verification data that only exist in hardcopy format at the end of

the program year should be avoided. This would ensure that all relevant data are stored in a single location, and would likely reduce the turnaround time for data requests.

Increase Level of Detail in Utility Updates: As with the prior program year, utility staff reported that the updates they receive from CADC regarding program performance are mainly limited to participant counts and overall costs. Utility staff are not aware which customers participated in the program or which measures were installed until the end of the program year. CADC should increase the level of detail within these reports and include participant names, addresses, measure counts, and other information if possible. This will allow the utilities to identify participants, to understand more about how the program is performing, and to potentially estimate preliminary savings.

Investigate Air Infiltration Reduction Procedures: As discussed in Section 2.6.1 of this report, the Evaluators identified discrepancies between reported air infiltration leakage rates and verified air infiltration leakage rates. In order to potentially address this issue or identify the cause of these discrepancies, the Evaluators provide the following recommendations:

- Include itemized air infiltration measures in tracking data: Thus far, the tracking data have not included information regarding what air sealing measures were installed (e.g. door sweeps, window sealing) in each home, or where they were installed (e.g. back door, bathroom window). Including this information in the program tracking data would allow the Evaluators to determine whether a discrepancy between reported and evaluated leakage could be due to measures becoming damaged, or customers removing measures.
- Include any air infiltration field notes for each home: Due to situational residence characteristics such as whether a fireplace flue is open or closed, or whether the homeowner did not allow the contractor to close a certain window, it is sometimes difficult to recreate the testing conditions that were present for the contractor measurement. Including information regarding any notable characteristics of the testing conditions that should be recreated during the verification process will minimize the potential for situational discrepancies.

Additionally, the Evaluators offer to have a discussion with CADC and the other agencies and their contractors regarding the methodology used during blower door testing in order to ensure that testing is conducted consistently among agencies, and between the agencies and the Evaluators.

Table 4-1 Recommendations from 2014 Program Year Evaluation

Issue	Consequences	Recommendation
Many AWP operational and performance issues are related to WAP operations and WAP requirements for community action agencies.	Restricts agency participation in AWP May create inconsistencies in data collection, leading to potential errors for the AWP	CADC should continue to make efforts to work with the AEO in developing a mutually beneficial working relationship, and maintain consistency between the two programs where feasible.
There were minor tracking data errors such as missing *ex ante* savings, calculation errors, and other missing fields in some cases.	Potentially lost savings Skewed measure-level realization rates	Resolve these tracking data issues for the 2015 program year.
Some utilities provide or link to program documents that are out-of-date. Most of the participating agencies do not discuss the AWP on their websites, and frame weatherization as an income-qualified service.	Customers may gain inaccurate information regarding service providers and other details. May reduce program interest from private co-pay customers.	The utilities should review their website materials and provide links to updated program documentation if possible. The agencies should provide information regarding the AWP on their websites, and explain that the program does not have an income level requirement.

Issue	Consequences	Recommendation
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	Potential lost data Potential delays in data transfer if additional data are needed	Agencies should maintain electronic records of all collected audit, implementation, and verification data.
Periodic program activity updates to the utilities do not include measure level cost data or measure counts.	Limits utility ability to plan for annual reporting Limits utility awareness of program performance	Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.
The reported air infiltration leakage rates appear skewed downward, based on the Evaluators' site visits.	Possible issues with measure implementation or data collection Possible discrepancies between implementation and verification that will lead to skewed realization rates.	1: Include itemized air infiltration measures in the tracking data so that the Evaluators are able to verify individual measure elements 2: Include any field notes related to the blower door test in the tracking data so that the Evaluators may more accurately recreate the testing conditions 3: Discuss air infiltration testing procedures with the Evaluators in order to ensure that the testing methodologies are consistent among agencies, their contractors, and the Evaluators.

Appendix B – AWP Program Description as of July 1, 2011 – as approved

Arkansas Weatherization Program ("AWP")
For Severely Energy-Inefficient Homes

AWP Collaborative

In 2007, the following utility companies ("AWP Utilities") collaborated with the Arkansas Community Action Agencies Association ("ACAAA") and the Arkansas Department of Human Services Office of Community Services ("DHS OCS") weatherization providers (collectively, the "AWP Collaborative") to develop the Arkansas Weatherization Program for Severely Energy Inefficient Homes ("AWP") to comply with the ***Rules for Conservation and Energy Efficiency Programs*** ("CEE Rules") established by the Arkansas Public Service Commission ("Commission") in Docket No. 06-004-R:

- Arkansas Oklahoma Gas Corporation
- Sourcegas Arkansas
- CenterPoint Energy Arkansas
- Empire District Electric
- Entergy Arkansas
- Oklahoma Gas & Electric
- Southwestern Electric Power Company

The AWP Collaborative has remained intact into the comprehensive phase of implementation of the AWP Utilities' approved energy efficiency portfolios. The AWP has evolved since its original approval in October 2007 as a "quick-start" program.

Benefits and Objectives

The AWP program is designed to have a high probability of providing aggregate ratepayer benefits to the majority of utility customers. Continued implementation of the AWP will potentially:

- Encourage and enable utility customers to make the most efficient use of utility capacity and energy and discourage inefficient and wasteful use of energy;
- Achieve energy efficiency improvements to severely energy-inefficient homes;
- Achieve meaningful energy and demand savings of both electricity and natural gas that contribute to:
    - Reduced energy costs for owners of severely energy-inefficient homes;

- Improved affordability of energy for all ratepayers through:
    1. Downward pressure on energy prices
    2. Avoided system capacity costs
    3. Reduced collections costs and bad debt write-offs
    4. Improved customer retention
- Energy security benefits;
- Environmental benefits;
- Economic development/competitiveness benefits;
- Permanent peak electric and gas demand reductions;
- Long term changes in customer behavior, attitudes, awareness, and knowledge of energy efficiency and energy efficiency technology;

- Enable the AWP Utilities to implement a weatherization program in an efficient manner; and
- Provide a comprehensive, consistent, quality-controlled, weatherization program serving energy-inefficient homes in utility service territories.

Program Design

- Target severely energy-inefficient homes using the following selection criteria:
    - Residential heating or cooling customers of at least one AWP Utility, to which savings can be attributed.
    - Site-constructed or mobile homes
    - Homes built prior to 1997 must meet three of the following seven criteria. Homes built in 1997 or later do not qualify for the AWP.
        1. Attic insulation equal to or less than R-30
        2. Wall insulation equal to R-0
        3. Floor insulation equal to R-0
        4. Single pane windows with no storm windows attached
        5. Non-working heating system or heating system with less than 70% efficiency
        6. Non-working cooling system or cooling system with Seasonal Energy Efficiency Rating ("SEER") of 8 or less

7. Air infiltration problems identified through:

a) visual inspection of ductwork, walls, floors, ceilings, doors, and windows; or
b) pre-blower door test resulting in: i) greater than 2,200 CFM at 50 pa (for households of five persons or fewer); or ii) greater than 2,700 CFM at 50 pa (for households of more than five persons)

- Pre and post carbon monoxide (CO) readings must meet the health and safety regulation specified by the U.S. Department of Energy ("DOE").

- AWP is modeled on the DOE Weatherization Assistance Program ("WAP"); however, it is open to all AWP Utility residential customers living in homes meeting the above selection criteria.

- AWP is implemented by the WAP delivery network of DHS OCS and Community Action Agencies/Service Providers with support and coordination from ACAAA (collectively, the "Weatherization Network").

- DOE WAP protocols, standards, and quality control provisions are followed.

- The following list of measures are approved for use in the AWP:
  - Attic insulation
  - Floor insulation
  - Wall insulation
  - Duct insulation
  - Duct sealing/repair
  - Sillbox insulation
  - Foundation insulation
  - Air infiltration
  - Window sealing
  - Window replacements
  - Storm windows
  - Low flow shower heads
  - Furnace replacements
  - Furnace tune-ups
  - Air conditioner replacements

- Air conditioner tune-ups
- Heat pump replacements
- Heat pump tune-ups
- Refrigerator replacements
- Lighting retrofits
- Water heater tank insulation
- Water heater pipe insulation
- Water heater replacement
- Smart thermostats

- Energy efficiency information will be provided to each participant as a part of the AWP.
- AWP cost of services (for energy audits, health and safety, materials and labor to install measures, and program support) will be capped at $8,000 for each home.
- The AWP Utilities will pay a percentage of the costs, with the share depending on whether the customer has only one participating utility (gas or electric), two participating utilities (both gas and electric), or lives in an all-electric house, provided that savings can be attributed to the respective utility.
- Weatherization Network administrative expenses will be 14% of the AWP cost of services for each home, with each customer co-payment amount and utility co-payment amount grossed up proportionately for Weatherization Network administrative expenses.
- As illustrated in Attachment C:
  - Where there is one participating AWP Utility (gas or electric):
    1. The AWP Utility will pay $146 toward the pre-installation audit, and the customer co-payment will be $196.
    2. The AWP Utility will pay up to $855 (of a targeted average cost of $3,420) for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.
    3. The AWP Utility will pay $57 toward the post-installation audit, and the customer co-payment will be $57.
  - Where there are two participating AWP Utilities (gas and electric):
    1. Each of the AWP Utilities will pay $146 toward the pre-installation audit, and the customer co-payment will be $50.

2. Each AWP Utility will pay up to $855 for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.

3. Each AWP Utility will pay $57 toward the post-installation audit, and the customer co-payment will be $0.

- Where the customer lives in an all-electric AWP Utility home (i.e., electric space heat):

1. The electric AWP Utility will pay $292 toward the pre-installation audit, and the customer co-payment will be $50.

2. The electric AWP Utility will pay up to $1,710 for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.

3. The electric AWP Utility will pay $114 toward the post-installation audit, and the customer co-payment will be $0.

- For customers served by an electric cooperative and with AWP gas utility space heat, the payment breakdown will be that of the scenario above for one participating AWP Utility.
- For customers served by an electric AWP Utility but with no AWP Utility space heat (*e.g.*, propane space heat), the payment breakdown will be that of the scenario above for one participating AWP Utility.
- Customers will be responsible for 100% of AWP cost of services beyond AWP Utility maximum payment amounts, up to the total cap of $8,000 per home.
- Low-income customers qualifying for the WAP may have DOE funds used to pay for the customer's AWP co-payment and for the customer's responsibility for costs up to the maximum allowed under DOE.
- Customers not eligible for DOE WAP assistance will make their applicable pre-installation energy audit co-payment in "good funds" to the Weatherization Network prior to their energy audit.
- Customers not eligible for DOE WAP assistance and making their own co-payments will be able to choose which measures will be installed after energy-savings potential has been determined by the audit. These customers will make full payment in "good funds" for their applicable co-payment for cost of AWP services to the Weatherization Network prior to the delivery of measures. All work will be done on a fixed price basis. AWP Utilities will hold Weatherization Network harmless from loss with respect to customer payments.

- "Good funds" include: bank certified check, bank cashier check, credit union certified check, or money order.
- Attachment B is the funding model for the AWP for the period of July 1, 2011 through December 31, 2011, for 2012, and for 2013. For the period July 1 through December 31, 2011, the target would be 620 homes weatherized, for a total utility spending target of $1,051,771. In 2012, there will be a 10% increase from the 2011 annualized number, to 1,259 homes and a total utility spending target of $2,130,818. There will be another 11% increase in 2013, to 1,402 homes, for a total utility spending target of $2,389,360.
- Under-spending of an AWP Utility's annual spending target in any program year will be carried over and added to the AWP annual spending target for the following program year, where demand and Network capacity indicate.
- Each AWP Utility will make utility co-payments each year up to at least its spending target amount, provided there exists both demand for AWP services by its customers and capacity for delivery of AWP services by the Weatherization Network.
- Total AWP Utilities' co-payments during a year may not exceed 120% of that year's AWP spending target.
- Any home can receive AWP benefits only one time.
- AWP Utilities' administrative costs resulting from the AWP are not included in the spending targets shown in Attachments B or C. Each AWP Utility has included utility administrative costs for the AWP in its Comprehensive Energy Efficiency program filing to include incremental program costs not included in its base rates.

Administration and Implementation

- All AWP Utilities will have one "joint" contract with Central Arkansas Development Council ("CADC") for delivery of all AWP services through the Weatherization Network.
- The AWP Collaborative will meet as necessary during the term of the AWP to review progress of the AWP and to provide guidance and support to the Weatherization Network.
- By utilizing the existing Weatherization Network for statewide training, administration, coordination, delivery and quality control activities, the AWP administrative costs will be less than if each AWP Utility developed its own individual delivery system.
- A single point of delivery will remove the significant market barrier of customers having to coordinate utility programs on their own.

Promotion

- Each AWP Utility may, but is not required to, promote the AWP locally using targeted marketing techniques designed to create demand for the AWP to match the capacity of the Weatherization Network to deliver AWP services.
- AWP Utilities agree to not use statewide promotion of AWP unless targeted marketing is not successful in meeting the objective in the previous bullet.
- AWP Utilities agree that promotion of AWP will include the following message elements: 1) the local AWP Utility is, or AWP Utilities are, offering to assist customers in making cost-effective energy efficiency improvements to their homes, to save them money while helping to improve the environment by weatherizing their homes and providing other energy efficiency measures; 2) customers will receive services on a first-come-first-served basis; 3) customers will be required to contribute to the cost of energy audits and to the cost of energy efficiency improvements to their homes, although those eligible for the low-income WAP may have federal funds used to pay their contribution; and 4) program design and availability of AWP services may be changed with approval of the PSC.
- Should the AWP be under-subscribed, as it has been in some areas previously, the program will be analyzed for barriers to participation, and those barriers will be addressed collaboratively with an appropriate marketing and promotion strategy.
- Should the AWP become severely over-subscribed (waiting time for service of more than one year), this situation will be addressed by:
    - Suspending all promotional activities;
    - Sending letters to all customers on the AWP waiting list explaining the situation;
    - Analyzing the cause of over-subscription of the AWP; and
    - Collaboratively considering appropriate strategies for addressing the over-subscription.

Barriers and How They Are Being Addressed

- As barriers or challenges arise, they are being addressed by the AWP Collaborative through periodic meetings and other contact.
- Affordability of home weatherization services for many customers is being addressed through utility co-payments toward energy audit AWP services on each home.
- Limited utility experience with weatherization programs is being addressed through the AWP Collaborative process (seven investor-owned utilities in partnership with the Weatherization Network).

- Inefficiency of utility administration for individual smaller utility weatherization programs is being addressed through: 1) the AWP Collaborative process to design and file the AWP, and 2) "joint" contract with CADC for delivery of all AWP services through the Weatherization Network as described in this AWP design template.
- Multiple points of contact by customers with both AWP gas service and AWP electric service for individual utility weatherization programs is being addressed through one AWP with one customer point of contact for all AWP services.

Estimated Annual Energy Savings and Estimated Demand Savings

- For AWP weatherization measures installed in 2010 and costing a total of approximately $1,315,948 (utility co-payments only), estimated energy savings and estimated demand savings at the customers' meters are:
    - 125,183 therms (normal weather conditions)
    - 6.4 therms per day per home (peak demand conditions)
    - 3,670,098 kWh (normal weather conditions)
    - 1.12 kW per home (peak demand conditions)
- Estimates of energy and demand savings for the period of implementation covered by this design, *i.e.*, July through December 2011, 2012 and 2013, based on measured results from 2009, follow:[1]
    - July–December 2011
        - 146,495 therms (normal weather conditions)
        - 6.4 therms per day per home (peak demand conditions)
        - 2,541,906 kWh (normal weather conditions)
        - 1.12 kW per home (peak demand conditions)
    - Program year 2012
        - 302,120 therms (normal weather conditions)
        - 6.4 therms per day per home (peak demand conditions)
        - 5,155,668 kWh (normal weather conditions)
        - 1.12 kW per home (peak demand conditions)

[1] These estimates of energy and demand savings were up-dated once results from implementation of the AWP during 2010, 2011 and 2012 were reviewed and analyzed.

- Program year 2013
  - 327,020 therms (normal weather conditions)
  - 6.4 therms per day per home (peak demand conditions)
  - 5,748,480 kWh (normal weather conditions)
  - 1.12 kW per home (peak demand conditions)

Funding and Cost Recovery

- Each AWP Utility will deposit funds into the AWP working fund quarterly or more frequently as necessary to assure a positive balance always exists in the AWP working fund.
- The AWP working fund shall be an interest bearing account.
- Each AWP Utility will incur AWP costs as a result of its customers' participation in the AWP and its resulting utility co-payments for energy audits, measures, and Weatherization Network administrative expenses.
- For those low-income customers eligible for the WAP, federal funds may be applied towards customer co-payments.
- Each AWP Utility may apply for recovery of its AWP costs through an approved adjustment to rates in its own Comprehensive Energy Efficiency docket.

Evaluation, Measurement and Verification ("EM&V")

- The Weatherization Network will maintain financial and operational data for each AWP home for the duration of the AWP and will deliver all utility-specific data to each AWP Utility at least quarterly.
- Commission-approved deemed savings for both energy savings and demand savings for both natural gas and electricity will be used to estimate AWP energy savings and demand savings for each AWP utility.
- Estimated energy savings and estimated demand savings for AWP-installed measures will result from use of Commission-approved deemed savings estimates developed by Frontier Associates.
- Consistent with WAP protocol, Community Action Agencies/Service Providers will audit 100% of their own AWP projects and DHS OCS and/or CADC will audit at least 10% of all AWP projects with a DOE WAP co-payment annually.
- Minimum data to be reported to each AWP utility and to the PSC for each program year to determine whether the AWP is meeting its stated objectives include:

- Number of energy audits completed;
- Number of home weatherization projects completed;
- Number of customers who requested AWP services and have not yet received AWP services (i.e., the backlog);
- Summary analysis of customer satisfaction survey results;
- Total AWP utility co-payments for AWP services (energy audits and measures) including 14% markup for Weatherization Network administrative expenses;
- Total customer co-payments for AWP services (energy audits and measures) including 14% markup for Weatherization Network administrative expenses;
- Estimated annual energy savings for kWh and for therms; and
- Estimated peak demand savings for kW and for therms per day.

- AWP utilities and ACAAA will annually report AWP EM&V data consistent with rules and procedures established by the Commission.

Benefit/Cost Evaluation

- The AWP Utilities individually conduct benefit/cost analyses of the AWP based on deemed savings estimates provided by Frontier Associates and each utility's avoided energy and demand costs.
- The Utilities' analyses show that the AWP provides aggregate ratepayer benefits to utility customers.
- National and international research studies show that weatherizing severely energy inefficient homes provides considerable benefits to society in addition to energy and demand savings.

Appendix C - AWP Customer Satisfaction Survey Results: Program Year 2014

In addition to providing data on energy and demand savings, productivity, program costs, and other quantitative data, as part of the annual reporting process, to assess customer satisfaction with the AWP, the Weatherization Network providers survey each household that has received AWP services during that year. In 2014, two different questionnaires were used. Samples of these questionnaires are in Appendix D:

- **Client Response Form** (asked participants to confirm that work done through the AWP was completed and if any measures were not implemented at the request of the client) One question asked participants to rate the quality of materials and workmanship involved in the program. Additional comments were also solicited.

- **AWP Satisfaction Survey** (confirming that work has been completed; rating energy audit information, materials used, workmanship, speed of delivery of services, overall satisfaction with the AWP; comments) This survey was prepared for use in both the AWP and DOE WAP.

The AWP Satisfaction Survey represented over 99% of the surveys submitted, making these results more uniform than in the past. Additionally, there were at least 11[1] customers who were private co-pay customers.

A total of ***133*** completed and usable responses were received:

- ***1***Client Response Form
- ***132*** AWP Satisfaction Surveys

Summary results by type of questionnaire are reported below.

Client Response Form

1. How would you rate the overall work on your residence?

   Overall Rating (1response):
   Excellent ***1*** (***100***%)
   Good ***0*** (***00***%)
   Fair ***0*** (***00***%)
   Poor ***0*** (***00***%)
   No response ***0*** (***00***%)

   Comments:
   A total of ***1*** comment was received.

   0comments (***0***%) were negative:

[1] 8 private pay jobs were audit only.

1 comment (***100***%) was positive:

- On time and completed, very respectful.

Home Weatherization Program Satisfaction Survey/
AWP Satisfaction Survey

Were you satisfied with the information supplied in the **Energy Audit** (***132*** responses):

Very Satisfied ***121*** (***92%)***
Satisfied ***11*** (***8***%)
Dissatisfied ***0*** (***0***%)
Very Dissatisfied ***0*** (***0***%)
No Response ***0*** (***0***%)

Were you satisfied with the **Material Used** for the weatherization work? (***132*** responses):

Very Satisfied ***122*** (***92***%)
Satisfied ***10*** (***8***%)
Dissatisfied ***0*** (***0***%)
Very Dissatisfied ***0*** (***0***%)
No Response ***0*** (***0*** %)

Were you satisfied with the **Workmanship** of the delivered service? (***132*** responses):

Very Satisfied ***122*** (***92*** %)
Satisfied ***10*** (***8*** %)
Dissatisfied ***0*** (***0*** %)
Very Dissatisfied ***0*** (***0***%)
No Response ***0*** (***0*** %)

Were you satisfied with the **Speed of Delivered Services** (***132*** responses):

Very Satisfied ***115*** (***87*** %)
Satisfied ***16*** (***12*** %)
Dissatisfied ***1*** (***1***%)
Very Dissatisfied **0** (***0***%)
No Response ***0*** (***0***%)

Were you satisfied with the weatherization Program as a whole? (***132*** responses):

Very Satisfied ***124*** (***94***%)
Satisfied ***7*** (***5*** %)
Dissatisfied ***1*** (***1*** %)
Very Dissatisfied ***0*** (***0*** %)
No Response ***0*** (***0***%)

Please provide an explanation for any comments you scored a 1 or 2:

- Electrician took too long to schedule install

Please provide any additional comments or suggestions: A total of ***20*** comments were received. Of those, ***19*** comments (***95***%) were positive. Some examples:

- Everyone has been so polite and helpful.
- We are very happy with the service.
- I thank God for CAPCA and the good people I met. They care and that was shown in the work that they do.
- I am happy to have received this service. It will be of a great help. My living conditions are so much better now.
- These are some good guys.
- They were very neat and clean. The guys were friendly and respectful. I was very impressed.
- I was immediately impressed with the sound quality after the windows were installed in a year.
- I loved the work that they did for me (5).
- I really appreciate the work that was done on my house and all of the workers were so respectful and kind. Thanks so much.
- This is an awesome program. It needs to continue to help people who are unable to help themselves.
- Awesome job :). (2)
- The men were very professional and nice.
- Am satisfied with the work they were supposed to do. They did a wonderful job.

Of the remaining comments under this query, only one was negative.

- I just hate I wasn't able to receive attic insulation, but I think CADC were able to upgrade and install **(LK: Ceiling was not strong enough to hold additional insulation because it was made up of cardboard ceiling tile and it already had 5.5 inches in it. The added weight would tear the ceiling down.)**

Appendix D Customer Survey Response Form

CLIENT RESPONSE FORM

NAME: _____

DATE: _____

JOB NO: _____

The occupant(s) of the dwelling located at:

_____

_____

Confirms that the work done by the WEATHERIZATION ASSISTANCE PROGRAM of CENTRAL ARKANSAS DEVELOPMENT COUNCIL has been completed.

_____ The following measures were not done due to the request of the client.

_____

_____

Please check one of the following categories, which describe the quality of materials and workmanship involved.

(___) **EXCELLENT**
(___) **GOOD**
(___) **FAIR**
(___) **POOR**

ADDITIONAL COMMENTS:

_____

_____

_____

_____

_____
Signature of Occupant

AWP Satisfaction Survey

Agency:
CADC

Date of Satisfaction Survey: _____/_____/_____
Customer Name: _____ Job Number _____
Customer Address: _____
City: _____ State: _____ Zip: _____
County: _____
Please use the following scale to answer the question below:

4 - Very Satisfied 3 - Satisfied 2 - Dissatisfied 1 - Very dissatisfied

Were you satisfied with the information supplied in the energy audit?	☐ 4	☐ 3	☐ 2	☐ 1
Were you satisfied with the material used for the weatherization work?	☐ 4	☐ 3	☐ 2	☐ 1
Were you satisfied with the workmanship of the delivered service?	☐ 4	☐ 3	☐ 2	☐ 1
Were you satisfied with the speed of delivered services?	☐ 4	☐ 3	☐ 2	☐ 1
Were you satisfied with the Weatherization Program as a whole?	☐ 4	☐ 3	☐ 2	☐ 1

Please provide an explanation for any responses you scored a 1 or a 2:

_____
_____
_____

Please provide any additional comments or suggestions:

_____
_____
_____

This confirms that work has been completed and the following measures were not done at the request of the occupant.

_____
_____
_____

_____ _____
Client Date

Form 5 Page 1 of 1

Appendix E

Information Provided to Clients

During the auditor's initial visit to the AWP customer household, the network provides information on ways to save energy beyond the weatherization measures to be installed. Depending on the agency, this can be done verbally during the walk through or through written materials that the auditor provides to the client. The five agencies that performed work on AWP clients and the service territory covered during calendar year 2014 were as follows:

Central Arkansas Development Council (CADC) – Calhoun, Clark, Columbia, Dallas, Garland, Hempstead, Hot Spring, Howard, Lafayette, Little River, Miller, Montgomery, Nevada, Ouachita, Pike, Polk, Saline, Sevier, Union

Community Action Program for Central Arkansas (CAPCA) – Faulkner, White, Cleburne, Perry, Garland, Yell, Pope, Johnson, Logan, Scott, Franklin, Conway

Crawford-Sebastian Community Development Council (C-SCDC) – Crawford, Sebastian, Benton, Carroll, Madison, Washington

Crowley's Ridge Development Council (CRDC) - Craighead, Crittenden, Cross, Greene, Jackson, Mississippi, Poinsett, St. Francis, Woodruff

Pine Bluff - Jefferson County Economic Opportunities, Inc. (PBJCEOC) - Arkansas, Ashley, Bradley, Chicot, Cleveland, Desha, Drew, Grant, Jefferson, Lee Lincoln, Monroe, Phillips, Prairie

Information Provided

CADC

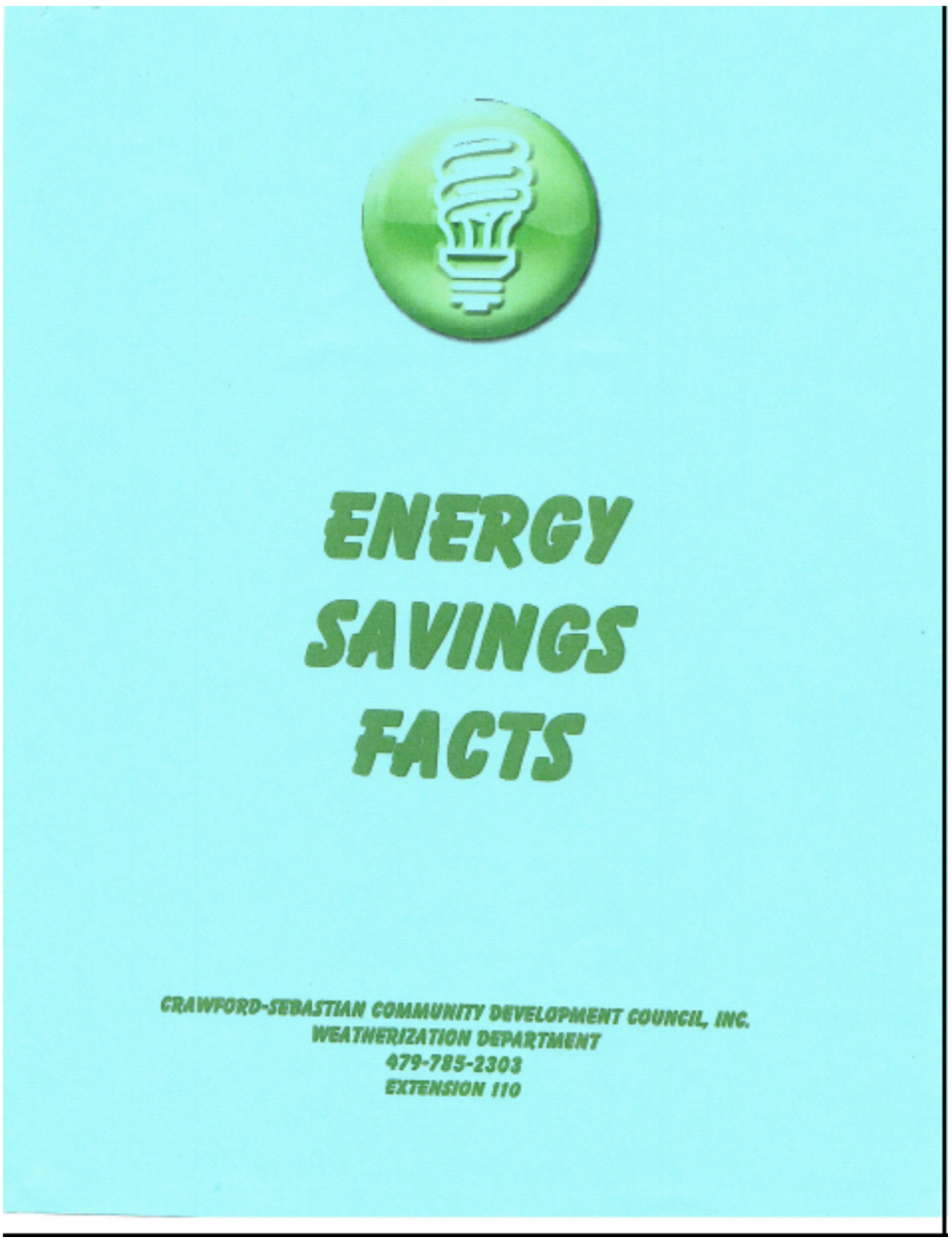
Among the materials CADC provided were 12 donated weatherization kits provided to clients on a first come first served basis. Each donated client kit consisted of the following materials:

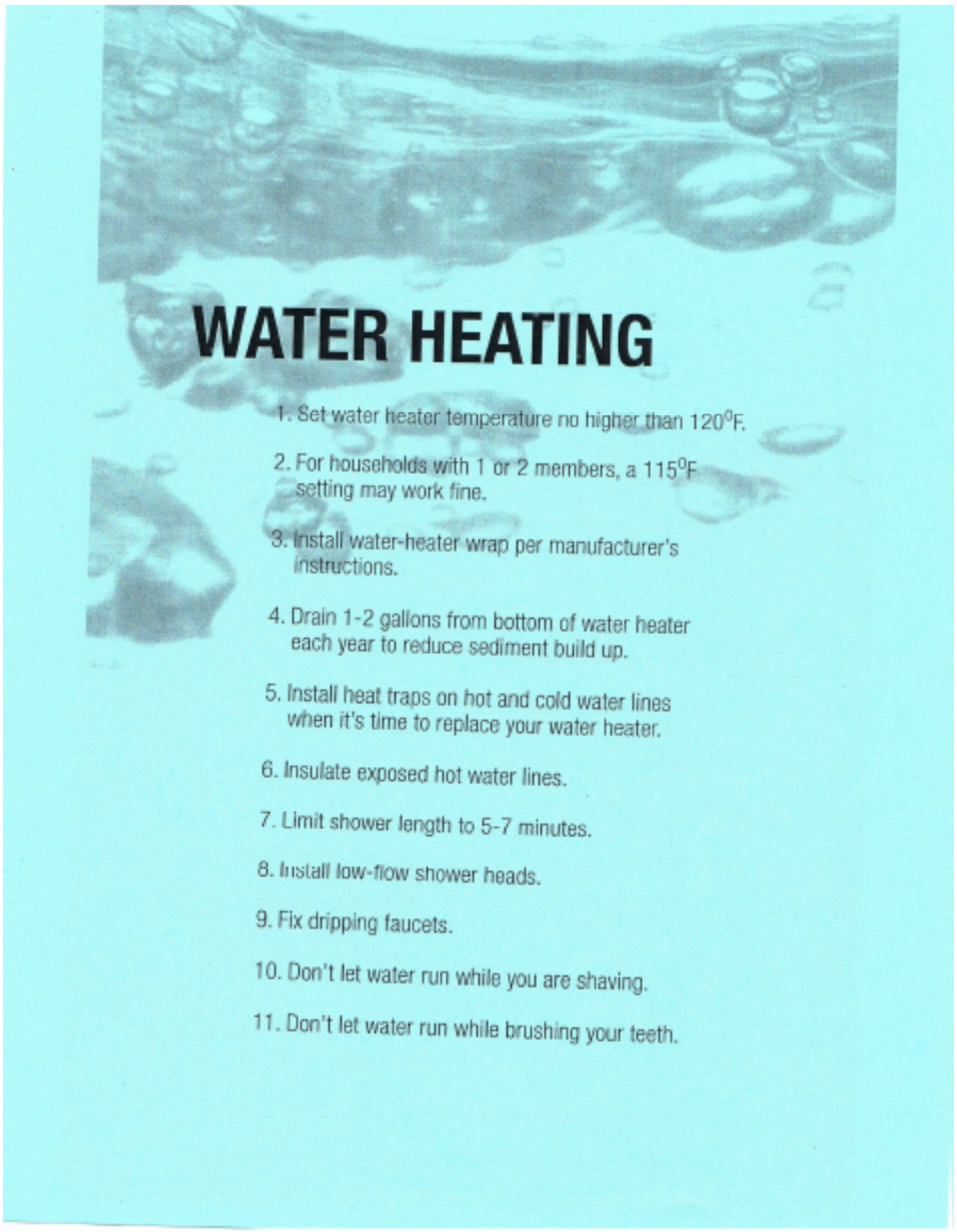
- 2 rows of foam tape
- Water heater jacket
- Compact Florescent Lightbulbs
- Tube of Caulk

C-SCDC

C-SCDC made in house fact sheets that were given to clients. The following images are from that sample packet.

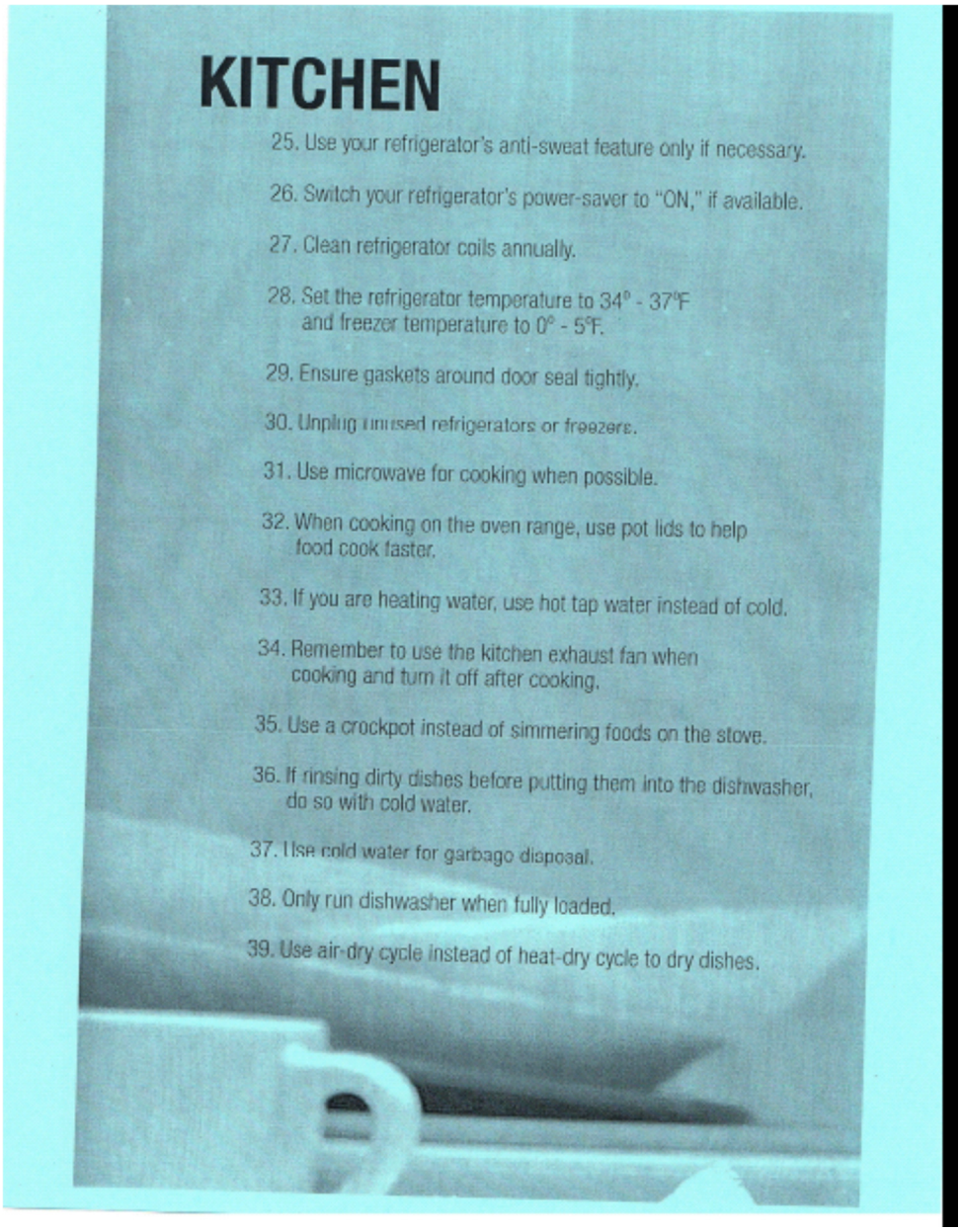
Sample Packet from C-SCDC Given to Client





WATER HEATING

1. Set water heater temperature no higher than 120°F.
2. For households with 1 or 2 members, a 115°F setting may work fine.
3. Install water-heater wrap per manufacturer's instructions.
4. Drain 1-2 gallons from bottom of water heater each year to reduce sediment build up.
5. Install heat traps on hot and cold water lines when it's time to replace your water heater.
6. Insulate exposed hot water lines.
7. Limit shower length to 5-7 minutes.
8. Install low-flow shower heads.
9. Fix dripping faucets.
10. Don't let water run while you are shaving.
11. Don't let water run while brushing your teeth.


KITCHEN
25. Use your refrigerator's anti-sweat feature only if necessary.
26. Switch your refrigerator's power-saver to "ON," if available.
27. Clean refrigerator coils annually.
28. Set the refrigerator temperature to 34° - 37°F and freezer temperature to 0° - 5°F.
29. Ensure gaskets around door seal tightly.
30. Unplug unused refrigerators or freezers.
31. Use microwave for cooking when possible.
32. When cooking on the oven range, use pot lids to help food cook faster.
33. If you are heating water, use hot tap water instead of cold.
34. Remember to use the kitchen exhaust fan when cooking and turn it off after cooking.
35. Use a crockpot instead of simmering foods on the stove.
36. If rinsing dirty dishes before putting them into the dishwasher, do so with cold water.
37. Use cold water for garbage disposal.
38. Only run dishwasher when fully loaded.
39. Use air-dry cycle instead of heat-dry cycle to dry dishes.

MISCELLANEOUS

45. Turn computers and monitors off when not in use.

46. Make sure electric blankets are turned off in the morning.

47. Turn waterbed heater off when not needed.

48. Turn large-screen TV's off completely when not in use.

49. Turn off stereos and radios when not in use.

50. Remember to turn off hair curling irons and hot rollers.

51. Turn off coffee makers when not in use.

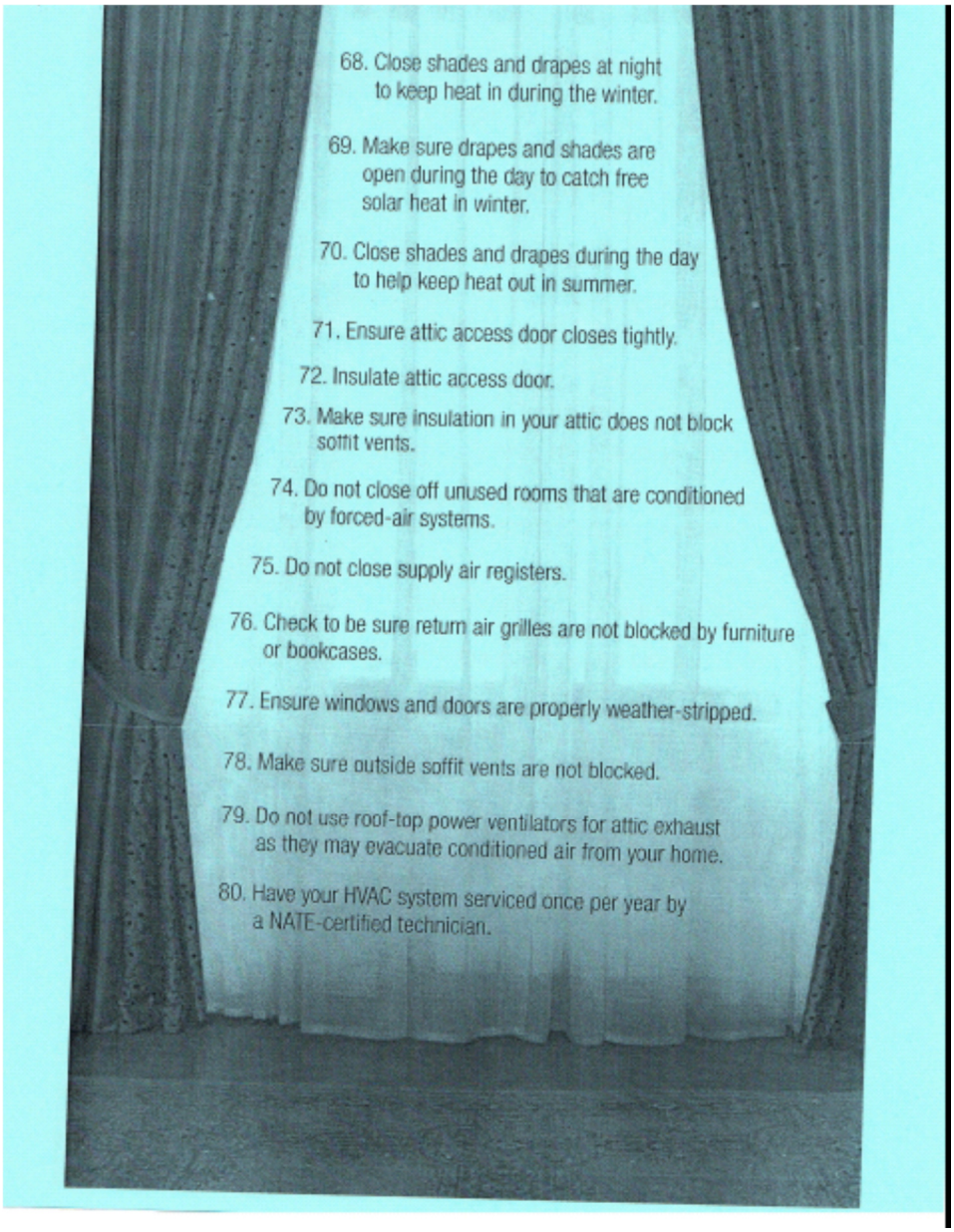
52. Turn off pool pump and/or heater when not needed.

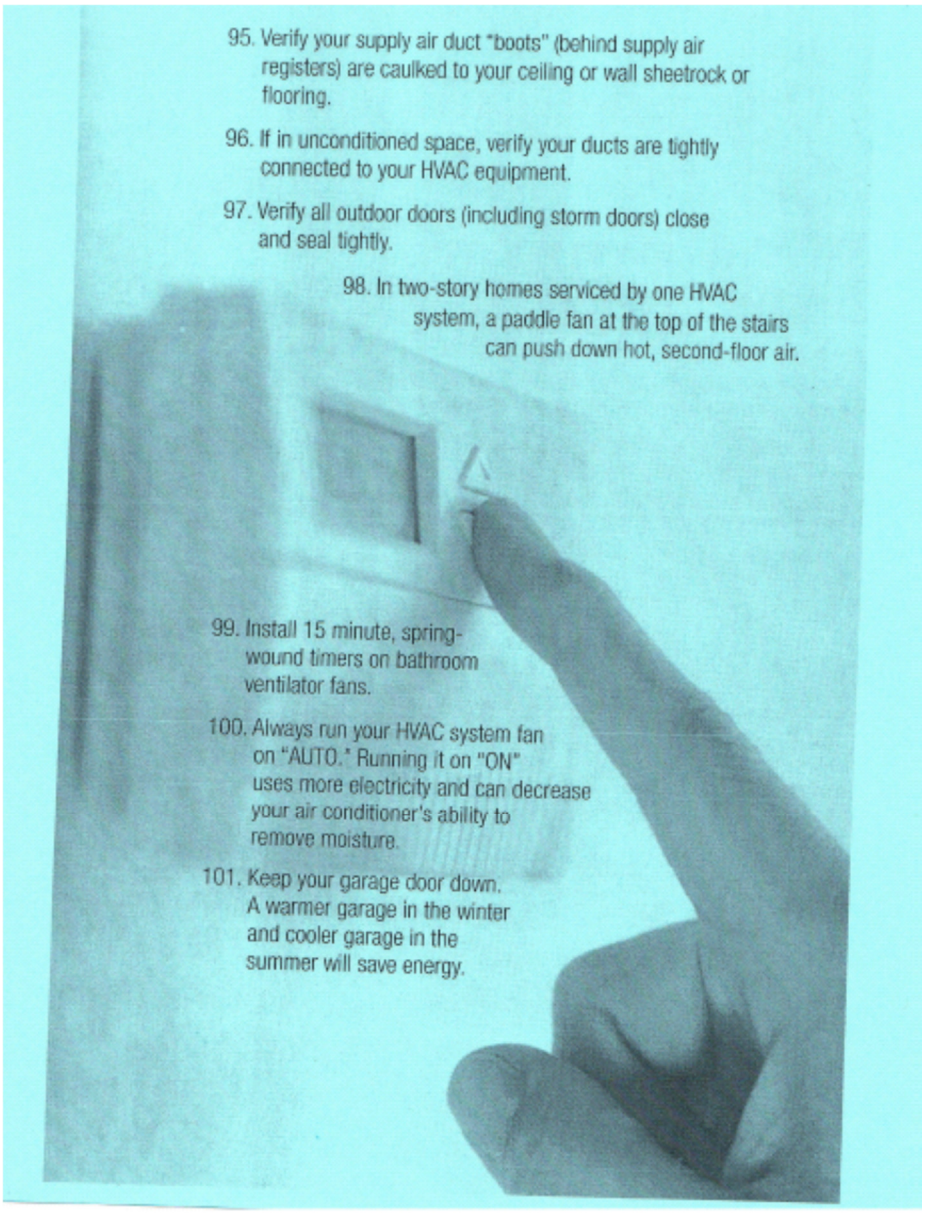
53. Verify livestock water tank heaters are off when not needed.

54. Make sure heat tape is off when not needed.

55. Unplug battery chargers when not needed.

56. Ensure all new appliances purchased are Energy Star approved.


68. Close shades and drapes at night to keep heat in during the winter.
69. Make sure drapes and shades are open during the day to catch free solar heat in winter.
70. Close shades and drapes during the day to help keep heat out in summer.
71. Ensure attic access door closes tightly.
72. Insulate attic access door.
73. Make sure insulation in your attic does not block soffit vents.
74. Do not close off unused rooms that are conditioned by forced-air systems.
75. Do not close supply air registers.
76. Check to be sure return air grilles are not blocked by furniture or bookcases.
77. Ensure windows and doors are properly weather-stripped.
78. Make sure outside soffit vents are not blocked.
79. Do not use roof-top power ventilators for attic exhaust as they may evacuate conditioned air from your home.
80. Have your HVAC system serviced once per year by a NATE-certified technician.



95. Verify your supply air duct "boots" (behind supply air registers) are caulked to your ceiling or wall sheetrock or flooring.

96. If in unconditioned space, verify your ducts are tightly connected to your HVAC equipment.

97. Verify all outdoor doors (including storm doors) close and seal tightly.

98. In two-story homes serviced by one HVAC system, a paddle fan at the top of the stairs can push down hot, second-floor air.

99. Install 15 minute, spring-wound timers on bathroom ventilator fans.

100. Always run your HVAC system fan on "AUTO." Running it on "ON" uses more electricity and can decrease your air conditioner's ability to remove moisture.

101. Keep your garage door down. A warmer garage in the winter and cooler garage in the summer will save energy.

Additional handouts:

The table below lists online resources and booklets that either some or all of the agencies provided to AWP clientele. The table lists the material source/website, the name of the materials, and the agency or agencies that provided the information:

Agency/Agencies	Info Provided to WAP Clients	Information Site/Description of Information
CAPCA, CADC, CRDC, PBJCEOC, C-SCDC	**The Lead-Certified Guide to Renovate Right - accessed 03-16-15**	http://www2.epa.gov/sites/production/files/documents/renovaterightbrochure.pdf
CAPCA, CADC, CRDC, PBJCEOC, C-SCDC	**A Brief Guide to Mold, Moisture, and Your Home - accessed 03-16-15**	http://www.epa.gov/mold/pdfs/moldguide.pdf
CAPCA, PBJCEOC, C-SCDC, CRDC	**EPA Fact sheet: Protect Your family From Asbestos-Contaminated Vermiculite Insulation - accessed 03-16-15**	http://www2.epa.gov/asbestos/protect-your-family-asbestos-contaminated-vermiculite-insulation
PBJCEOC	**Energysaver Guide: Tips on Saving Money & Energy at Home - Accessed 03-16-15**	http://energy.gov/sites/prod/files/2014/09/f18/61628_BK_EERE-EnergySavers_w150.pdf
	30 Simple things you can do to save energy and money	Book given to clients provided from Arkansas Energy Office
	Energy Efficiency Facts: Locating and Sealing Air Leaks - Accessed 03-16-15	http://www.energyefficiencyarkansas.org/wp-content/uploads/2011/07/locating-and-sealing-air-leaks.pdf
	Energy Efficiency Facts: Cooling - Accessed 03-16-15	http://www.energyefficiencyarkansas.org/wp-content/uploads/2011/07/cooling.pdf
	Energy Efficiency Facts: Heating - Accessed 03-16-15	http://www.energyefficiencyarkansas.org/wp-content/uploads/2011/07/heating.pdf
	Energy Efficiency Facts: Lighting and Appliances - Accessed 03-16-15	http://www.energyefficiencyarkansas.org/wp-content/uploads/2011/07/lighting-and-appliances.pdf
	Energy Efficiency Facts: Water Heating	http://www.energyefficiencyarkansas.org/wp-content/uploads/2011/07/water-heating.pdf

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Annual Report has been served electronically upon all parties on the Service List of the above-captioned Dockets on this thirty-first day of March 2015.

____/s/ Jerrold Oppenheim_____

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